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ABSTRACT

The aim of this guide is to alert persons with an operational interest in scientific communication to new ideas, techniques, and equipment in the field of communication media and publications. The focus is on the dissemination of scientific information via the technical journal or its equivalent. Secondary dissemination of information such as bibliographies, data bases, and services are treated incidentally. The guide is organized into five sections: innovations in conventional journal and monography publishing, print-on-paper alternatives, non-print-on-paper and mixed media innovations, trends and prospects, and innovations needed. Each section is subdivided into individual entries describing particular processes or innovations. This guide has been designed as an "idea book" to help small scientific societies, journals, and publishers as well as to increase general awareness of innovations and stimulate development of new ideas. (CH)

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IMPROVING THE DISSEMINATION OF SCIENTIFIC AND TECHNICAL INFORMATION:

A Practitioner's Guide to Innovation

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organized into systems. So far as possible, we have broken these systems apart into their individual components for treatment in separate entries, so that the reader who wishes to avoid radical change will not be forced to consider innovation in terms of conversion to a totally new system. (In some cases, of course, the system itself was the innovation, and had to be treated as a whole.) The Guide also contains a section on areas in which innovations are needed, but have not yet (so far as we know) been developed.

We have tried to write the Guide in such a way that each entry may stand alone, as a self-contained article. Thus, the reader should be able to read front-to-back, or section-by-section, or pick out individual articles of interest, without impaired intelligibility. Writing for this kind of flexibility has necessitated a certain amount of redundancy among certain entries; we have accepted this as the price one must pay for modularity.

Limitations of the Guide

It is important that the reader understand clearly what the Guide can and cannot do. We have *not* tried to write a manual or set of prescriptions. Our aim has been much more modest: to put together an "idea book," which identifies and briefly describes a variety of concepts, practices, and systems that are worth investigating. We do not mean to "sell" any particular innovation. Unfortunately, the business of scientific communication–especially scientific and technical publishing–is enormously complicated. Each case is unique, affected by so many variables that there can be no single "right" way to publish a journal or operate a communication program.

The reader will notice that several of the entries describe incompatible alternatives. This was both conscious and intentional, and is quite in keeping with the Guide's "idea-book" character. The interests, requirements, and resources of scientific communicators vary so widely that we think it desirable to make known as many alternatives as possible; the choice of one alternative over another, however, is an individual matter, outside the Guide's scope.

For similar reasons, we have *not* tried to incorporate into any entry all of the information–especially the financial information–that a reader would need to adopt an innovation. Because of the tremendous variety in the needs and circumstances of scientific communicators, that would be impossible. In fact, to try to present that kind of detail within the confines of the Guide would be misleading and dangerous, since it might lead the unsophisticated or unwary user to make questionable decisions. What we *have* tried to do is give enough information about each innovation to permit the reader to decide whether he would like to learn more about it.

We had still another reason for omitting certain information from the Guide. We want to be able to monitor the Guide's impact very closely. To facilitate this, we have intentionally constructed the Guide in such a way that interested readers will often be required to contact us for further information. The reader should consider the Guide to be merely a tool for access to our files.

How to Obtain Additional Information

We welcome questions, comments, and suggestions. We maintain files for all entries in the Guide and on many related subjects; persons interested in any individual innovation, or in ordering a copy of the Guide, should contact us. In addition, we would like to hear about other innovations that should be included as the Guide is updated. As these are identified and described, we will prepare new entries and distribute them to the Guide's users.

INTRODUCTION

This Guide is intended to serve anyone who has an operational interest in scientific communication. Its aim is to alert such persons to ideas, concepts, techniques, and equipment that are new to them, and that they might use to make communication easier, more effective, or less costly. Realizing the importance of innovation to the improvement of scientific communication, and recognizing that information concerning it has hitherto been scattered and hard to find, the National Science Foundation has sponsored the preparation of this Guide. The study team that prepared it will continually collect, analyze, and disseminate information that can be used to improve scientific communication.

Scope and Focus of the Guide

The present Guide's focus is on the "primary" dissemination of scientific information: the technical journal or its equivalent. In other words, we deal here with the initial recorded transmission of information. (The reader will soon see that a number of other mechanisms may perform at least some of the journal's functions.) "Secondary" dissemination of information (i.e., bibliographic publications, data bases, and services) will only be treated incidentally, where an innovative method of primary dissemination interacts with some sort of bibliographic activity. "Tertiary" dissemination–review reports and articles–is likewise excluded from this edition of the Guide. We are interested in *all* aspects of information transfer, however; we will describe innovations in other areas in additions to this Guide, and in other, specialized guides.

We have construed "innovation" very loosely in preparing this Guide. Because what is familiar to one organization may be new and striking to another, we have considered innovation to mean anything that departs significantly from the traditional ways of preparing, organizing, or disseminating scientific information.

The innovations covered in the Guide run a wide gamut; they include new equipment, communication concepts, processing methodologies, media of communication, and organizational approaches to scientific communication.

We hope that the Guide will be of particular value to representatives of smaller scientific societies, journals, and publishers. A number of innovations in the Guide are designed to reduce the costs associated with journal publishing, and should be interesting to organizations with limited financial means.

We also hope that the Guide will increase general awareness of possibilities for innovation, and stimulate the discussion and development of new ideas. The National Science Foundation hopes that the Guide will help to focus this discussion and development; we will attempt to serve as a catalyst in the overall improvement of scientific communication.

Organization of the Guide

We have organized the Guide's contents into sections, according to the degree of departure from conventional journal and monographic publishing. Each section is made up of a number of individual entries, describing particular innovations. In many of the applications that we examined while we were preparing the Guide, we saw a number of innovations

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A great many people contributed generously to the development of this Guide. It would be impossible to name everyone who helped, but we would like at least to identify those whose contributions have directly affected the Guide's format and contents.

Two advisory panels provided guidance to the project. The first, a group of Technical Advisors, included:

A. Gregory Abdian, retired, formerly Vice President, Informatics Tisco, Inc., and General Manager, NASA Scientific and Technical Information Facility

Richard H. Belknap, Director, Printing and Publishing Office, National Academy of Sciences

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William R. Nugent, Acting Coordinator, Information Systems Office, Library of Congress

The Technical Advisors reviewed the project plan, helped to identify candidate innovations and innovators, and helped the project staff to evaluate incoming information.

A second group, the User Advisory Panel, was formed later. It consisted of distinguished representatives of groups that might be expected to use the Guide. Its members were:

Joseph F. Caponio, Director, Environmental Science Information Center, National Oceanic and Atmospheric Administration

Mark S. Carroll, Director of Professional Publications, National Park Service

Robert A. Day, Managing Editor, Publications Office, American Society for Microbiology

David B. Dobson, McGregor and Werner, Inc.

A. F. Spilhaus, Jr., Executive Director, American Geophysical Union

The User Advisory Panel reviewed a draft of the prototype Guide and suggested additions, deletions, and modifications of style, content, and format. Their suggestions were invaluable.

While we were collecting information, literally hundreds of persons offered us candidate innovations, referrals, and other useful information. These persons included representatives of scientific societies, commercial firms, academic institutions, and government agencies. The entire list of these contributors is too long to include here. We gratefully acknowledge their help, however, and would like to call attention to the following individuals, whose assistance directly influenced the contents of this first installment of the Guide (those whose contributions have yet to be incorporated into the Guide will be named in future issues):

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SECTION I

INNOVATIONS IN CONVENTIONAL JOURNAL AND MONOGRAPHIC PUBLISHING

The vast preponderance of primary scientific and technical information-dissemination is carried out through conventional journals, monographs, and R&D reports. Although new forms of communication are becoming increasingly attractive and feasible, these conventional forms of communication will continue to be important for the foreseeable future.

However, many innovative techniques and concepts can be applied to the production of conventional publications; innovations of this type are described in this section of the Guide. Many of the conceptual innovations deal with possibilities for simplifying the publication process to reduce costs; many of the technological innovations deal with new forms of composition, which permit the production of attractive text at relatively modest cost. Other innovations deal with improved methods of marketing publications and increasing the revenues derived from publishing activities.

Due to the relatively large number of innovations presented, this section has been divided into eleven subsections (see Table of Contents). The first subsection (I.1) deals with the "Capture and Recording of Information," and begins on the following page. Succeeding subsections are separated by blue divider pages.

AUTHOR-PREPARED CAMERA-READY COPY

Description

Authors' typed manuscripts are finding increasing acceptance as camera-ready copy for offset printing. A number of societies have used author-prepared copy in the published proceedings of their meetings for some years. Recently, however, scientific publishers have begun to use author-prepared copy for journals, monographs, and books, as well.

When this is done, the publisher informs the author that his manuscript will be directly photographed for printing, and that it must be camera-ready. The publisher also gives the author instructions concerning format, acceptable type face(s), line spacing, page size, paper quality, and anything else he considers important to the appearance of the finished publication. The author is then responsible for providing an error-free manuscript typed in accordance with the publisher's instructions.

The publisher does not recompose the paper. He will probably photo-reduce the author's typescript and use the reduced copy for page make-up (correct line spacing is important here); this will save considerable space and paper. Alternatively, the publisher may simply photograph the pages of manuscript, so that the publication exactly duplicates the appearance of the typescript. The publisher can use author-prepared copy for full-sized print, miniprint, or microform.

Benefits

The primary benefit of using author-prepared copy is that it saves the publisher the expense of composing the text. Since composition costs constitute a major portion (usually about 50%) of the total cost of producing a scientific journal or short-run book, this savings can be considerable.

Some journals have adopted the use of author-prepared camera-ready copy in an effort to reduce the time lag between an article's submission or acceptance and its appearance in the printed journal. The reasoning behind this application of the idea is that processing time for any manuscript would be reduced. A number of persons experienced in the use of author-prepared copy, however, question this: at best, they say, use of author-prepared copy results in marginal reduction of throughput time. Unquestionably, however, it reduces the number of processing *steps*. And, since it eliminates re-keyboarding (for composition), it eliminates the possibility of introducing new errors into an author's text. Furthermore, there is no question that it substantially reduces publishing costs. In addition to saving the cost of composition, it can help to minimize author alterations.

Problems and Limitations

Although using author-prepared copy is economically attractive, the publisher must face several problems. First, a certain amount of effort is required—especially in the early stages of application—to get authors to provide acceptable copy. One of the major annoyances for the publisher is that authors seem, at first, unable to understand that their submissions must be free of all stylistic and typographical errors—that any errors in their submissions will appear in the publication. Frequently, authors will find errors, or decide they want to make changes, after the manuscript is in the publisher's hands. They telephone the publisher, and ask that the changes be made. Most publishers who use author-prepared copy refuse to make such changes; if the author insists that the changes are necessary, the manuscript will be returned, and the author must make the change himself. This can lead to a certain amount of friction. At the same time, as mentioned, this can reduce the number of author alterations ("AA's"). It is generally agreed that AA's account for an unreasonable portion of the cost of composing a journal. Using author-prepared copy reduces the incidence of AA's overall, and shifts most of their burden and expense from the publisher to the author.

The publisher must exercise care, and work closely with the authors, to ensure that the authors' typescript will reproduce legibly. Ideally, the publisher will produce formal guidelines for all authors to use in preparing their camera-ready copy, and will include illustrations with the guidelines. The publisher may go so far as to provide special blue-line paper (guide-marks printed in non-photoreproducible blue ink) for authors to use in typing the final versions of their articles.

Resistance to use of author-prepared camera-ready copy may come from several quarters. Authors may resist the notion, both because of the care that it requires of them and because they feel slighted by the graphic appearance of a publication produced in this manner. Editors and readers may object for aesthetic reasons.

In actual fact, however, acceptance by readers has generally been very good—much better than editors had anticipated. Authors, too, seem to adjust, once the publisher succeeds in educating them as to their new responsibilities. In point of fact, the use of author-prepared copy for meeting proceedings and similar publications has served to prepare the scientific community for its use in more formal publishing.

A final limitation worth noting concerns the cost savings effected through use of author-prepared copy. While it is true that use of author-prepared copy is more economical than composing articles in the usual way, some of the cost-reduction will be offset by increased paper consumption if the author-prepared copy is not photo-reduced before plates are made.

This example shows the relative compactness of composed text as compared to author-prepared camera-ready strike-on composition. Full-size copy produced in pica type fits 10 characters to the running inch, whereas copy composed in 10-point type fits 17.4 characters to the running inch. Line spacing with camera-ready strike-on composition may also be a factor, depending upon the degree of photoreduction used in producing the offset masters.

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Applicability

Use of author-prepared copy deserves especially serious consideration in the case of very short-run publishing—i.e., journals, monographs, and books produced for very small audiences. In such a situation, the cost of composition constitutes a very large portion of the cost of publication. It is also worth considering for any publisher whose finances are severely limited.

A special case in which author-prepared copy might be particularly attractive would be publication in disciplines that require extensive use of esoteric symbols. Should the publisher compose text involving such symbols, problems may arise, since many photocomposition systems, although generally attractive and economical, lack such special characters.

The attractiveness of using author-prepared copy would not be so great in the case of long-run publishing, because here the fixed cost of composition is a smaller component of total production costs (because it is amortized over a large number of copies). Additionally, in publications that involve long press runs, the demand for graphic quality is likely to be greater; this might further limit the appeal of author-prepared copy.

The best way to evaluate the desirability of using author-prepared copy is to determine and compare the costs of several alternative approaches to composition for a given publication: monotype, photocomposition, in-house strike-on composition, and use of author-prepared copy. In addition to comparing the costs of these alternative approaches, the publisher must decide, at least intuitively, how much weight to attach to graphic quality.

Management Considerations

The publisher must define the limits of what will be considered acceptable copy from authors, and make sure that his requirements are ones that authors can practically meet. The stringency or flexibility of these requirements will vary according to how concerned he is with uniformity or graphic quality. (There is no general rule concerning what sort of requirements authors will be able to meet. One engineering journal "requires" that author-prepared copy have justified right margins. About 30-40% of the articles that are published in this journal do indeed have justified margins; evidently, a sizable percentage of the authors who write for this publication have access to composing devices.) Having defined the requirements that will apply to author-prepared copy, the publisher must prepare explicit guidelines that convey these requirements clearly and logically. He must also have personnel designated to answer questions, handle complaints, and generally assist with authors' problems.

The only requirement for "special" equipment applies to authors: they must have access to typewriters (or other keyboard devices) capable of producing typescript that will satisfy the publisher's requirements. What this means in practical terms will vary. In the case just mentioned, authors are encouraged to use a composing device of some sort; in most applications, however, the requirement would merely be that the typeface and ribbon be of sufficient quality to ensure the publication's legibility.

Otherwise, no special equipment or personnel is needed. This, in fact, is part of the appeal of the author-prepared-copy approach to composition.

OCR FOR AUTHOR-PREPARED SCANNABLE COPY

Description

Loosely defined, Optical Character Recognition (OCR) refers to the automatic conversion of written or printed material (marks, numbers, letters, special signs) by a photoelectric device (a "scanner") into computer-readable form. Early practical applications of this technology were limited to recognition of marks, as in the grading of multiple-choice tests. Later, special typefaces were developed which could be "read" by optical scanners, although they might be confusing or illegible to human readers. Subsequently, special typefaces were developed which could be used to prepare text for input into a computer data base through OCR. The first of these differed radically in appearance from normal typescript. With the passage of time, however, scannable typefaces have been developed that more closely resemble familiar styles. Recently, a hybrid OCR typeface has been developed, in which each "character" has two components. The upper part is a conventional letter, number, or sign. Beneath this, there appears a unique configuration of small bars; this configuration constitutes the scannable code. At the same time that OCR typefaces have been refined, the accuracy of the scanners that "read" them has been improved. At present, OCR is accurate, rapid, and inexpensive enough to be commercially useful as a way of inputting text for computer-driven photocomposition systems.

Three Examples of OCR-Readable Type Faces

DATA CORP. SCANNERS. IT IS OFFERED WITH A VARIETY OF KEY-
PUNCH SIMULATOR KEYBOARDS AND AN ADDING MACHINE SIMULATOR.
‡‡‡‡‡‡‡Ⱶ24567‡3‡‡—‡{1‡‡‡}‡ ⱵH*$%|&⌘□△--=+↓↑?/°’:;8,9.
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

tions involving REI scanners. Also known as the Perry Font,
it is identified as REI-X04 by Recognition Equipment Inc.
ABCDEFGHIJKLMNOPQRSTUVWXYZ !¶@$%/&*()--{}¤△?/+=:;,.
abcdefghijklmnopqrstuvwxyz 1234567890

style combining conventional characters with a bar code to
meet the requirements of the Dataflow Optical Reading System.
ABCDEFGHIJKLMNOPQRSTUVWXYZ ><#$%△&*()∧•-+ ß?/‘□:;,.
abcdefghijklmnopqrstuvwxyz 1234567890

In present applications, keyboarding in scannable form of the material to be phototypeset is done at the central processing facility (the compositor's or printer's) by specially trained typists, using typewriters equipped with OCR fonts. This requires that the manuscript be keyboarded twice: once by the author, and a second time to generate input for the photocomposition system. Recent developments, however, might make possible the elimination of the second keyboarding, by permitting the author to prepare his manuscript in scannable form.

Authors could be supplied with OCR-compatible fonts for typewriters that use interchangeable elements (e.g., IBM's Selectric). In fact, IBM offers about a half-dozen OCR elements for its Selectric typewriters. All of these are quite legible to humans as well as to scanners, although the design of the characters differs significantly from that of more traditional styles.

In principle, there is no reason why authors could not use typing elements of this sort to produce manuscripts that could be automatically converted to machine-readable form. To ensure compatibility between the typeface used by the author and the processing system used by the publisher, the publisher should provide the author with the element (requiring that it be returned with the manuscript). Upon receipt of the author's manuscript, the publisher would process it through an optical scanner to produce a computer-readable record, probably on punched paper tape or magnetic tape. The contents of this tape would be edited with a VDT, and a clean tape prepared. The clean tape would be run through a photocomposition system to produce galleys or page proofs. These would be sent to the author, who would return them with his corrections. A new paper tape would be produced, embodying all corrections, and this would be run once more through the photocomposition system to produce finished output. In this entire process, the author's paper would be keyboarded just once, by the author himself. All subsequent modifications and corrections would be made at a VDT terminal, with the text being displayed from a paper-tape or magnetic-tape store.

Benefits

Such a system should have several advantages. First, it would transfer the time-consuming and expensive process of keyboarding the manuscript for composition from the publisher to the author. The publisher's ability to process manuscripts should be substantially increased by such a change, since the conversion to machine-readable form, using OCR equipment, is very rapid. Thus, at the same time that the publisher's processing capability is increased, the cost of processing a manuscript should decline. Reducing the number of times a manuscript is keyboarded should also help to improve quality control, since each re-keyboarding provides an opportunity for errors to creep into the copy.

Problems and Limitations

First, the practicability of this system is dependent upon authors' having access to typewriters that can accept the OCR elements, and on the physical integrity of both the typewriters and the typing elements that the authors use. A number of seemingly minor deviations from ideal typescript could seriously affect the processability of the author's manuscript. For example, failure to use a fresh carbon ribbon could result in a blurring of the characters that would interfere with processing. A broken character would not be recognized by the scanner; similarly, an improper adjustment of pressure on the typewriter could result in impressions that the scanner could not read. In short, the system would be sensitive to physical factors, some of them not very obvious, which would have to be carefully controlled.

In addition, use of an OCR system would require that the author follow certain conventions in preparing his manuscript. These conventions differ from one system of OCR to another, and would have to be thoroughly described and explained in guidelines that the publisher would furnish the author.

Adoption of this system would create problems in the handling of special characters and symbols. It would not be possible to enter them in their "finished" form, since the manuscript would present the optical scanner with symbols that it could not recognize. Thus, the publisher's instructions would have to make special provision (e.g., codes to define the special characters) for material that included symbols not available in the OCR font. This would almost certainly be inconvenient for the authors. This problem would arise most commonly and seriously when authors try to keyboard articles containing mathematical or chemical notations. Present OCR systems are not able to handle such material in any convenient way.

Applicability

This system's applicability is limited by three considerations: the processing system that the publisher uses for converting the OCR input into machine-readable form and for photocomposing the final copy, the availability to authors of the required typewriters and typing elements, and the type of material to be keyboarded. Author-prepared OCR input should be considered only as an extension of an existing system for computer-assisted editing and photocomposition–preferably, one which already has provision for OCR generated in-house. Such a system is likely to be found only in a large printing or publishing operation, although this might act as a service bureau for smaller publishers. The important points to bear in mind when considering the applicability of this system are that it merely provides input, that it must work smoothly with the basic text-processing system, and that, should any problems develop, the publisher must have alternatives available.

Management Considerations

If author-prepared OCR input is implemented as an extension of an existing text-processing and composing system, the investment may be moderate. The publisher will already have an OCR capability, geared to in-house production. He will have to invest in the typing elements that the authors will use, but, with care, these should last a long time. The number of elements required will be determined by the number of authors simultaneously using them to prepare manuscripts.

The publisher will also need to prepare instructions for the authors to use in preparing their manuscripts. It may be advisable for the publisher to prepare special blue-line paper for the authors to use, to ensure conformity to the formatting requirements of the OCR system.

Otherwise, no special materials or equipment will be needed. In fact, adoption of this system should permit the publisher to reduce his in-house staff, since he will be keyboarding fewer manuscripts.

Sources of Additional Data

"Product Update: Optical Readers," A *Modern Data* Staff Report; *Modern Data*, October 1974.

"Don't Key It! Read It: Optical Character Recognition," by Richard F. Maihofer; *21st Proceedings of the Society for Technical Communication*, May 1974.

Optical Character Recognition Character Sets, Federal Information Processing Standards Publication #32; U.S. Department of Commerce, National Bureau of Standards, Washington, DC, 20234, 1974.

"A Bibliography in Character Recognition: Techniques for Describing Characters," by R. Shillman *et al.*; *Visible Language*, Vol. 8(2), Spring 1974.

For an interesting variation on this basic concept, see:

"Can Scholars Publish Their Own Books?" by David W. Packard; *Scholarly Publishing*, October 1973.

Subsection I.2.

EDITORIAL PROCESSING

TELEPHONE-ASSISTED REFEREEING OF JOURNAL ARTICLES

Description

Telephone contact between the editorial office and referees customarily takes place after the reviewer has a paper in hand. In "telephone-assisted" refereeing, however, the telephone is used to speed the assignment of manuscripts to reviewers, and to accomplish part of the review process.

The editorial office maintains the usual file of referee names, addresses, and areas of interest. When a manuscript arrives at the editorial office, central-office personnel search this file until they come to the first referee whose interests appear to match the content of the paper. They telephone this referee, and read to him the paper's title, abstract, and any portions that the referee thinks necessary to determine (a) whether he is the appropriate person to review the paper, and (b) whether the paper should be given further review, or rejected out of hand. If the referee feels that he is not competent to judge the paper's merit for further review, he is asked to name someone who is. The editorial office then contacts the suggested individual, who is added (if necessary) to the file of reviewers. In this way, papers are not sent to reviewers who are unable or unwilling to review them. At the same time, the group of reviewers available to the journal is continually and conveniently expanded.

Benefits

The principal benefit of this approach to refereeing is that it speeds the review process considerably. One organization that adopted this practice found that the time required to have papers reviewed dropped from 2-4 months to 2-4 weeks. Secondarily, this approach should improve the quality of reviews, because referees deal only with papers in whose contents they are interested and competent.

Problems and Limitations

The obvious limitation is the expense incurred through long-distance telephone calls. This may be substantial, but must be weighed against the costs of processing manuscripts entirely in the traditional way (which may be greater than one would imagine), and against the value to the publisher and his constituency of the more rapid processing of manuscripts.

Applicability

Telephone-assisted refereeing would be most appropriate for journals that deal with large numbers of manuscripts, do not have sizable backlogs, and publish in a variety of disciplines or sub-disciplines. These are likely to be large, broad-interest journals. In the case of smaller, more narrowly focused journals, referee assignment is likely to be less problematic. Also, the problem of unrefereed manuscripts accumulating is likely to be less severe.

Management Considerations

No special equipment, training, or personnel would be required. The editor would want to inform his reviewers of the change before implementing it. Access to the editor's files of reviewers would be necessary for the editorial personnel who ordinarily handle correspondence with reviewers. In essence, the change would merely involve conversion to telephone of communication previously handled by mail.

Source of Additional Data

"Keeping Alive in the Information Explosion" by Robert V. Ormes, in *A Workbook for Journal Editors,* Association of Academies of Science, Washington, D.C. 1970.

LIMIT OR ELIMINATE COPY-EDITING OF JOURNAL ARTICLES

Description

In conventional journal publishing, an author sends his accepted manuscript to an editorial facility, where it is carefully edited. This editing involves several tasks. The copy editor carefully reads the paper to see whether it conforms to the journal's standards for format, organization, method of listing references, and so forth. He also reviews the style to ensure that it is linguistically acceptable and conforms to whatever conventions the journal follows (concerning, for example, such things as use of the first person, use of standard abbreviations for commonly used terms, etc.). The copy editor may also verify certain factual aspects of the paper; this might include checking arithmetic calculations and verifying the accuracy of bibliographic citations.

This process accounts for a significant portion of the cost of publishing, yet its contribution to the quality of the finished publication is hard to measure. It is essentially a rather expensive form of quality control. A number of editors, publishers, and printing specialists now feel that this control should be exercised minimally or not at all. Otherwise, they say, it costs more than it is worth.

They maintain that the author of an accepted paper should be able to supply a manuscript that is clearly written in acceptable prose, factually correct, and organized and presented in such a way that its contents will be intelligible to readers. This, they say, is *all* that should be required. Solecisms and stylistic idiosyncrasies are the responsibility of the author, not the journal. The copy-editor, if there must be one, should be restricted to an absolute minimum of changes and corrections, even though this may be difficult (it is a truism that many copy-editors are frustrated writers, ever eager to improve other people's prose). The editorial facility should emphasize the necessity for the author to provide exactly what he wants to appear in print.

Benefits

The benefit of minimizing copy-editing would be to reduce the cost of editorial processing and shorten the time required for publication, since manuscripts would spend less time in the facility.

Problems and Limitations

The editor should understand that by reducing the amount of editing, there will be more variation in form and style among papers appearing in his journal. To some persons, and for some journals, this may be very undesirable.

If the copy-editor is to take less responsibility for the form, cleanliness, and accuracy of a paper, it is absolutely essential that the author take commensurately more responsibility. This should be made clear through announcements in the journal, and in the instructions sent to authors of accepted papers. Occasionally, the editor may find it necessary to return a manuscript to an author because it is riddled with errors and inaccuracies. Once authors get used to the notion that errors in the manuscripts they submit will be reproduced in the printed journal, this problem should diminish.

Applicability

The idea of sharply curtailing or eliminating the amount of copy-editing performed on journal manuscripts should have very wide applicability in scientific and technical publishing. In fact, the concept itself is merely a crystallization of a trend that has been in progress in major scientific publishing operations for some years. There is precedent for this idea in the production of many conference proceedings; it has become quite common by now, even among large societies, to publish conference papers without editing them (often, in fact, using author-prepared copy).

We should point out that the idea we are describing here is an alternative to the one-step proof-corrections system (SEE: I.2.3–One-Step Proof Corrections). The two concepts are united in the use of author-prepared camera-ready copy (SEE: I.1.1–Author-Prepared Camera-Ready Copy), but if the publisher wishes to assume any responsibility for the quality of style found in his journal, it is best to use one approach or the other, rather than both.

Management Considerations

If authors' manuscripts are to be published with little or no editing, the editor must provide authors with very detailed and explicit guidelines, and/or be rather flexible in deciding what is acceptable. He must also be prepared to return a manuscript to the author for correction, if he finds that it does not meet the requirements for publication. This will call for both firmness and tact. It goes without saying, of course, that authors must be given sufficient advance notification of the adoption of this editorial policy.

ONE-STEP PROOF-CORRECTIONS

Description

In traditional printing, corrections to typeset copy are made in two stages. The editorial office sends edited copy to the printer, who sets it in type, then pulls galley proofs, which he sends to the author and editor for correction. The corrected galleys are returned to the printer, who enters the corrections and makes the type up into pages. He then pulls page proofs, which he sends to the editor (and sometimes the author) to verify the correction of errors found in the galleys, and to obtain approval of materials that have been stripped into the pages.

Some publishers have telescoped this process. In their system, the printer pulls galley proofs and sends them to the author and editor as usual. Without waiting to receive corrected galleys, however, he immediately begins page make-up. The errors that the author indicates in his corrected galleys are corrected on the page masters, so all corrections are made at once.

Benefits

This system, if properly managed, yields two benefits: it saves both time and money. The amount of processing is reduced, and the time required for publication is shortened, since one cycle is eliminated.

Problems and Limitations

To be effective, this system must be well managed. Basically, this means minimizing the number of corrections that the printer must make, since it is more expensive to correct page proofs than galleys. The editor can do two things to minimize the number of corrections. First, he can devote special attention to the copy-editing performed in the editorial office, so that the copy he sends to the printer will be virtually error-free. Second, he must make sure that authors understand that their accepted manuscripts, as submitted to the editorial office, *must* be as the authors wish them to appear in print. When authors correct galley proofs, they must understand that the only acceptable changes will be the correction of typographical errors. Authors' alterations are the bane of the typesetter's existence even under normal circumstances; in the present system, they have no place, unless they are absolutely necessary.

Applicability

This system should be applicable to most scientific journal publishing.

Management Considerations

The editor or manager who wishes to adopt this system must be sure that he has the in-house editing capability required to provide the printer with clean, error-free copy. He should also notify authors, both through announcements in the journal and in the letters of acceptance sent to them, of how the system works. He should explain its benefits, and make sure they understand the importance of submitting their manuscripts in final form.

He should also be prepared to deal firmly with those authors who have been spoiled by the conventional system of publishing, and who try to make extensive changes in their papers after they see them in print. Generally, the reduced time required for publication under this system should encourage authors to cooperate.

Source of Additional Data

"Economics of Printing" by Robert A. Day; *Economics of Scientific Publications,* Council of Biology Editors, Washington, D.C. 1973.

AUTOMATED MANAGEMENT OF JOURNAL REFEREEING

Description

The system that we will describe here is one that has been developed, and operated for the last several years, by a particular scientific society. There are probably other systems that serve the same purpose in operation elsewhere, with somewhat different features. What we wish to stress is the concept of the system, which represents a very straightforward application of computerized inventory processing to journal publishing.

This system relies on two files—one for referees, the other for manuscripts. These two files interact, but are created and maintained separately.

The referee file contains several thousand records, each pertaining to a specialist who has agreed to serve as a referee. Each record carries a number of pieces of information: a unique identifying number, a description by the specialist of his areas of interest and expertise, a string of index terms associated with these interests, a code identifying his parent institution, and an indication of any impending change of address or time when the referee will be unavailable. The system can search and sort on most of these items, so that, for example, it could automatically produce a list of all referees in a certain subject area, or a certain institution (or in a certain subject area in a certain institution). In addition, each referee's record contains the accession numbers of manuscripts sent to him for review, along with the date each was sent, and the date each was returned. These, too, are sortable, so the system can be used to automatically monitor the location and status of every manuscript that has been received.

When a manuscript is received, a keyboard operator prepares punched cards containing the title, author's name, an address code for the author, and a description of the paper (number of pages, number of illustrations and references, etc.). The machine used for this is a special one, designed to easily produce codes for special characters. To do this, it uses a number of shift keys, which can be depressed in combination with the regular keys of the standard keyboard. The information on the punched card is entered into the system's second file, the manuscript file. (Output from this file is produced on a modified teletypewriter terminal, with an expanded character set, which can designate most of the special characters needed for hard copy.)

By entering only two codes, the keyboard operator can order the system to regenerate the complete description of a manuscript, and prepare a mailing label. The system automatically prepares a descriptive package and acknowledgement for authors, 4" x 6" file cards for a manual file (maintained as backup to the computer system), evaluation blanks for referees, and letters to the referees. In addition, if the referee does not respond within a certain length of time, the computer automatically prepares a reminder letter. Should he not respond to this, the computer will automatically generate yet another, different, follow-up letter. After this, the delinquent referee's name and the manuscript in question are flagged for the editor.

As an article proceeds through review and editorial processing, and is published, the name of the journal, the volume, and page information are added to the manuscript's record. This is then used to produce photo-composable index material, so that the paper need not be reprocessed.

In this system, at present, the actual assignment of referees is a human decision. This is because the index terms entered in each referee's record are not specific enough to predict the appropriateness of a particular referee for a particular paper. The system does facilitate this decision, however, in that it can automatically extract the names of all the referees in a general subject area, show their current assignments, show how promptly they have acted on previous assignments, and indicate whether they are available. The society that developed the system plans to convert soon to a new indexing system, whose terms should be specific enough to let the system match referees to papers. No further change would be required for this, since the referee's record already carries a "loading" factor, which would be used to avoid overburdening each referee.

The system, which has been in operation since the late 1960's, currently operates only in batch mode, although it produces daily listings. The sponsor society plans to convert it to on-line operation in the near future.

Benefits

According to the sponsors, this system has contributed greatly to the speed of refereeing. It automatically keeps the whole process current, and has greatly lessened the error rate in the management of the review process. It has given the editor much greater control of "loading"–the workload imposed on each referee. It has drastically reduced the turnaround time in contact with referees. It has made it possible to keep track of the location of referees, without complicated correspondence, especially during the summer months. Its sorting options have contributed to the overall quality of reviewing.

Applicability

The main factor limiting the appropriateness of this system, as with many computer systems, is size. Computer processing is generally inexpensive (when calculated in terms of cost per item processed), but the developmental and set-up costs tend to be high, and there are certain basic operational costs which are relatively insensitive to the amount of material processed. As a result, very small-scale processing operations are generally not good candidates for automated data processing (ADP).

The system we have described contains records for about 6,000 referees. It serves five different journals. The system operating costs are about $1,500 per month; in addition, about $10,000 worth of personnel time per year is required to maintain and operate the system. The system is used once each year to produce a mailing to every referee in the file, which costs an additional $2,000; thus, the total cost of operating the system is in the neighborhood of $30,000 per year. It should be understood that this cost is quite apart from that of developing, installing, and de-bugging the system. Moreover, it is unlikely that a significant reduction in the number of referees, manuscripts, journals, or reports would reduce the cost of operating the system more than a few thousand dollars. Note that such a reduction would make almost no difference in the cost of designing the system; its only real impact would be in the area of data conversion, or entering information into the system; the cost of this should vary according to the amount of processing actually performed. Thus, the fixed cost of using a system of this type would be fairly substantial, and would put it outside the reach of many scientific publishers.

On the other hand, the cost per manuscript or per referee, when the system is being used at the level we are considering, is very modest, particularly in view of its advantages over manual processing.

This points out the applicability of the system. It can be advantageous for a publisher of any size; to be cost-effective, however, the level of operation should be substantial. If small publishers are to use such a system, they should band together and use it cooperatively, in a service-bureau mode. (The system we have described operates in this way, and has facilities for maintaining the privacy of certain information. In the reports that it produces, submissions to one journal are not announced to the editor of any other, even though the journals share a number of referees. Thus, the editor of any journal using the system can learn the "loading factor," or number of assignments, of any referee in the system, but he can *identify* only those assignments which are for his journal.)

Management Considerations

The editor who is interested in using the type of system we have described must consider several matters: the need or justification for using such a system, access to the system, and system capabilities. We will briefly consider each of these in turn.

As we have mentioned, use of this type of system is appropriate only when a substantial number of records (manuscripts and referees) are to be processed. Thus, if the editor expects to be the system's only user, he should be sure that the size of his operation will justify the expense. If, on the other hand, he does not have enough processing volume to justify the system, he should consider the possibility of using it jointly with other editors or publishers (as the system we have mentioned is used). In exploring this question of system justification, the editor or manager should try to compare the cost of operating in the traditional way with that of using the computerized system. This may not be easy, particularly since many of the costs associated with the management of refereeing are "buried," or spread among the journal's basic operating costs. Moreover, some of these costs–such as time-lags and unhappiness over mislaid manuscripts–cannot easily be discussed in monetary terms. Nevertheless, the exercise of trying to identify and quantify these elements of cost should be revealing and useful.

Should it appear from the foregoing analysis that the use of a computerized system would be justified, the manager must consider several options. First, he must decide whether to try to use an existing system that is already in operation, acquire such a system and have it installed in his own processing facility, or develop a new system. This is only partly a function of his processing needs. More important (because they are more variable) are the operating characteristics of existing systems and the possibilities for having access to them. The factors that affect this are partly organizational, partly technical. To use a system that is already operating would, of course, require the permission and cooperation of the organization(s) already using it. It would also, however, require that the system have certain characteristics.

If the prospective user is located at any great distance from the current processing facility, the system would need to have a communications capability. This would mean that it should offer on-line access, or that it at least be able to accept remote job entry (RJE). Otherwise, the logistics and delays involved in entering material into the system and receiving output from it would probably present so many problems that the system's benefits would be lost. (The organization that developed the system we have described as our model tried, some years ago, to operate it on behalf of another society located far away. This did not work well, and the arrangement had to be terminated. With an on-line system, however, such an arrangement might be quite feasible.)

It might be possible, as an alternative, for the prospective user to acquire the software for the system and install it in a convenient processing facility. To do this successfully, the prospective user would have to be sure that the new processing environment (computers and compilers) could accommodate the system. Some re-programming might be necessary.

The last alternative would be to develop a new system. This would be necessary if the prospective user could not arrange workable access to a system already in operation, could not acquire or use the software, or had some special processing requirement that made existing systems unsuitable. Considering the system that we have described, this last possibility seems rather unlikely. The requirements for a referee-management system should generally be similar, regardless of journal size or discipline. The system we have described has a number of capabilities built into it which should make it versatile enough for most applications. Any additional requirements could probably be better and more economically obtained by adding onto the existing system than by supplanting it with a new one.

LIMIT OR ELIMINATE REFEREEING OF JOURNAL ARTICLES

Description

Refereeing, or reviewing, of articles submitted to scientific and technical journals serves several purposes. Most journals operate within strict page limitations, or "budgets"; by refereeing incoming articles, the editors hope to ensure that only the most worthwhile of the manuscripts competing for the limited space will actually appear in the journal. Conversely, according to common precepts, refereeing serves to screen out articles that are inappropriate, factually incomplete or inaccurate, or in some other way unworthy of publication. In the case of a journal published by a professional society, both of these functions take on an added dimension: by publishing an article in its journal, the society may be inferred to give that article its imprimatur, or at least an air of respectibility by association. Because of this, the society that sponsors a journal is likely to feel that the articles appearing in the journal must be carefully refereed, to protect the society's integrity.

At the same time, refereeing performs important social functions connected with scientific communication. Publication in recognized journals constitutes a very important avenue to recognition and advancement. This phenomenon ("publish or perish") has been widely criticized; nevertheless, it remains a fact of life. The refereeing of journal articles is essential to this function. Were journal articles not refereed, acceptance of an article for publication would not carry the stamp of peer approval, and publication could not be used as an index of competence. (That the reliability, worth, and desirability of this whole system have been vigorously questioned in some quarters is a moot point: the important fact is that this is a very significant aspect of journal publishing.)

All of this comes at considerable expense, both in time and money. Some of the financial costs associated with refereeing may be hidden, particularly if the referee is unpaid and has some of his costs defrayed by his parent institution. Even so, these costs exist. Moreover, the journal publisher inevitably incurs other, more visible, processing costs in having manuscripts refereed. At the same time, the review process contributes significantly—in some cases *very* significantly—to the time-lags involved in publishing. Even under the most exceptionally favorable circumstances, the delay that refereeing introduces will be measured in weeks; more usually, the delay will be at least several months (varying from one discipline and journal to another); in extreme cases, the review process may delay a paper's publication by years (a case was recently reported in which a paper was under review for seven years—and rejected[1]). Most manuscripts that are accepted for publication are accepted conditionally, with the requirement that the author modify his submission according to suggestions from one or more reviewers. This process of negotiating the manuscript into form acceptable for publication commonly consumes several months.

In certain circumstances, the journal editor and publisher may decide that the costs of refereeing articles are not justified by the contribution that reviewing makes to the journal. In such a case, they have several options: to try to streamline the process without substantially changing it, to modify the procedure, or to eliminate it altogether.

Refereeing may be limited in several ways, any one of which is likely to impose a certain amount of hardship on the journal's editors. First, referees may be given strict time limits in which to reach a decision on the acceptability of manuscripts that they review.

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[1] " 'We Still Have Quite a Backlog of Articles . . . ' " by Robert C. Maddox; *Scholarly Publishing*, Vol. 6(2), January 1975.

Second, the amount of refereeing (i.e., the number of referees assigned to any manuscript) may be reduced to a minimum. Third, referees might be instructed to limit their review to a simple yes-no decision. To make any of these limitations work, the editorial office will have to monitor the review process very closely, and intervene as necessary.

Should the editor and publisher decide to eliminate refereeing altogether, the journal should carry an announcement to this effect. Some basic screening would still be necessary, but this could be held to a minimum. Abolition of refereeing need not affect the publisher's requirements concerning articles' length, organization, format, and other characteristics. Screening of articles to ensure that they meet these requirements, and to weed out articles which for special reasons should not be published, could be performed in the central editorial office. Authors should be advised that the manuscripts they submit must be completely ready for publication. (It would be possible, under such a system, to continue stylistic and redactory editing in the central office, although the editor might wish to forgo this. In fact, the editor and publisher might well wish to consider use of the author's manuscript as camera-ready copy.) (SEE: I.1.1.–Author-Prepared Camera-Ready Copy)

Benefits

There are two immediate benefits to be derived from limiting or abolishing the refereeing of journal articles: the time required to prepare an article for publication is greatly shortened, and the cost of processing a manuscript for publication is reduced.

Problems and Limitations

If the editor and publisher decide to limit refereeing rather than eliminate it, it is obvious that they wish to continue to exercise control over the quality of articles that appear in the journal. This being so, they must exercise care that, in trying to reduce the costs of reviewing, the benefits are not lost as well. This involves a delicate trade-off, and the editor is likely to find that the balance is never completely satisfactory. In conventional reviewing, multiple reviews are solicited to produce fairer, less questionable decisions (on the principle that a consensus judgment concerning a paper's acceptability has greater validity than a single opinion). If the number of reviewers is reduced, and the amount of time available for reviewing is held to a minimum, the incidence of questioned decisions is likely to rise. Thus, to streamline the review process without incurring serious problems of author acceptance may be quite difficult. At the same time, the editor may find that, simply from the viewpoint of operational management, limited, streamlined reviewing may be difficult to achieve. This is particularly likely if the reviewers donate their services, if the publisher does not defray their expenses, or if the reviewers are asked to look at a large number of manuscripts.

The prospect of abolishing refereeing poses even more difficult problems. In most instances, resistance to this idea will be fierce, especially among editors. Some readers may also oppose the elimination of refereeing very energetically, although where this change has actually been made, readers have generally been less unhappy than the editors had predicted. The objections that the editors raise are several; for the most part they reiterate the points mentioned at the beginning of this article. One additional objection, however, is worth noting. Editors often contend that without editorial screening of manuscripts, the journal would be flooded with submissions, causing an unmanageable publication backlog. This may be true, at least in part. The argument runs thus: if authors in a particular field know that there is one publication outlet which will not subject their articles to review by their peers, they will flock to this publication, since it will assure them visibility. This argument stresses the role of refereeing in screening out manuscripts that are inappropriate or of low quality, and assumes that a guarantee of acceptance can become an overriding determinant of where an author submits his manuscript. It overlooks the fact that there are other reasons for submitting to a particular journal. It also overlooks the possibility that abolishing refereeing may alter the social utility of publishing in a particular journal. A journal which does not referee manuscripts may come to be viewed as a mechanism for speedy dissemination of information–simply a tool for communication, without the connotations of peer approval and prestige imparted by a journal whose contents are extensively refereed.

Applicability

The possibility of limiting refereeing may be appropriate for consideration by any journal editor who finds that the review process contributes excessively to the delays involved in publishing. The appropriateness of doing away with refereeing will be much more limited. For the elimination of refereeing to be worthwhile, the journal would probably have to be in a field in which rapidity of information dissemination was at a premium. Furthermore, it is unlikely that such a change would be appropriate for a large-circulation journal. It would be particularly problematic for a journal, published by a scientific society, on whose intellectual and editorial quality the society felt its reputation to be based.

An unrefereed journal is likely to be most successful in a relatively narrow, well-defined field involving a small audience that is competent to judge for itself the quality of the journal's contents. Moreover, this field is likely to be one in a state of rapid development or flux, so that the prompt dissemination of new information would be important enough to offset any degradation in quality that the elimination of refereeing might entail.

Management Considerations

Any significant change in the amount or kind of scrutiny applied to journal articles will require careful evaluation and total commitment on the part of the journal's editors. Everyone connected with the change must realize exactly what is involved, and endorse the change. If refereeing is to be reduced to a yes-no decision, or abolished, readers and authors should undoubtedly be given an opportunity to react to the idea before implementation, since this is likely to affect the journal's basic character. If the idea is accepted by all of the parties concerned, implementation should be relatively straightforward. As has been mentioned, a fundamental change in the system of reviewing need not affect the journal's other requirements for submission. The editor and publisher will want to assess the probable impact of the change on the number of articles submitted and on circulation.

Sources of Additional Data

"President's Letter: About the Refereeing Process," by Jean E. Sammet; *Communications of the ACM*, Vol. 18(3), March 1975.

"ACM Forum: On the Refereeing Process," letter from Leslie Lamport; *Communications of the ACM*, Vol. 18(7), July 1975.

"Peer Review in Biomedical Publication," by Franz J. Inglefinger, M.D.; *The American Journal of Medicine*, Vol. 56, May 1974.

COMPUTER-ASSISTED DETECTION OF TYPOGRAPHIC ERRORS

Description

A computer program has been developed to simplify and speed the process of detecting typographical errors. The program requires limited computer storage capacity, and is easy to use. It can be used to detect errors in foreign languages, as well as in English.

Each document to be processed is typed into a computer. The proofreading program breaks each word in the source document down into all possible two- and three-letter segments. The program then compiles and stores a table, showing the number of times each of these segments appears in the source document.

The program next examines each word in the document against the frequency of its component letter segments, and assigns a numerical "index of peculiarity" to each word, depending on the rarity of the letter-segments that it contains. Every word in the document is then automatically displayed on a video display terminal (VDT) or printed out on a line-printer, in list form, with the words containing the most unusual letter-segments appearing at the beginning of the list. To reduce the length of this list, the user may define a table of words expected to occur commonly in the text that he processes; this list may include several thousand words. If he does this, each word in the source document will also be compared to the table of common words; those that appear in this table will not appear in the table generated by the "index of peculiarity." The number of words that appear in this table will depend more on the document's language than on its length.

The proofreader scans the display created by the computer to determine which words actually are misspelled. Most of the errors will be found in the first part of the list, since they are associated with high "indices of peculiarity." Once this is done, the proofreader reads the source document, but with the list of typographical errors already in hand.

Benefits

This system processes a document much more rapidly than does conventional proofreading. It is also much more effective than conventional proofreading, in that, according to tests, it permits a proofreader to locate virtually every typographical error in the source document; conventional methods result in a much lower rate of error detection.

Problems and Limitations

This program by no means eliminates the need for human proofreaders, nor will it perform (or even support) the entire proofreading function. It will not find missing words, extra words, or stylistic problems. Moreover, even after the program has been used, the proofreader must read the entire source document, although less care should be required for this. In its present form, this system will *not* indicate the location of a word that has been found to be misspelled. The human proofreader must perform this task. Although having a list of words to look for should be of considerable help, some of the misspelled words may be difficult to find. (In principle, there is no reason why this system could not be combined with a full-text storage and retrieval system, in which case one could use the computer to locate each misspelled word. The drawback to this would be that much larger computer storage capacity would be required, making the system and its operation much more expensive.)

Applicability

This system might be appropriate for publishers of large amounts of text, particularly if their requirement for accuracy is great.

Management Considerations

First, the publisher must have a data-processing capability. The program was written for the UNIX time-sharing system, and has been run on the PDP 11-45 mini-computer.

The publisher would need a terminal for document input and a VDT or line-printer for output. Keyboard operators would be needed to input the documents; proofreaders would have to interpret the output, and use it to correct the source document.

Sources of Additional Data

For descriptions of some early systems for automatic detection of typographic errors, see:

"A Program for Correcting Spelling Errors," by C.R. Blair; *Information and Control*, Vol. 3, 1960.

"A Technique for Computer Detection and Correction of Spelling Errors," by F. Damerau; *Communications of the ACM*, Vol. 7(3), 1964.

Two recent systems are described in the following documents:

"Computer Detection of Typographical Errors," by Robert Morris and Lorinda L. Cherry; *IEEE Transactions on Professional Communication*, Vol. PC-18(1), March 1975.

Computer Detection of Typographical Errors, by Robert Morris and Lorinda L. Cherry; Bell Laboratories, Murray Hill, NJ, 07974, July 1974. Computing Science Technical Report #18.

"Spelling Errors Automatically Detected by ANPARI's Newly Developed AUTOMARK," American Newspaper Publishers Association Research Institute; *R.I. Bulletin* #1179, January 31, 1975.

AUTHOR-PREPARED INDEX ENTRIES

Description

Asking authors of scientific articles to select index terms for their papers is not really new, in that some journals have been doing this for years. It has not yet become general practice, however, and it deserves consideration for many journals that have not yet tried it. The concept is quite straightforward; authors of accepted articles are asked to supply a list of descriptors (index terms) with the clean copy of their manuscript. These terms might be ones that the author selects from a list of approved descriptors provided by the editor (this is called a "controlled vocabulary"), or they might be "keywords," freely selected by the author ("uncontrolled vocabulary"), or some combination of the two. The editor might, if he wishes, limit the number of terms that the author may assign to his articles. (An alternative approach would be to instruct authors to submit up to a certain number of keywords with their original manuscripts. Reviewers who referee each manuscript would also review the keywords selected, so that the descriptors finally applied to the manuscript would be ones which carried the weight of professional consensus.)

The descriptors that the author supplies would be used to index his article. They might also appear on the first page of the article, near the title and abstract, to help readers decide whether the article was germane to their interests. Some journals contain printed citations and abstracts for their articles on perforated card stock in the back of the issue, to enable readers to establish card files for their journal collections. A journal that does this could print the author's index terms across the top of each respective card, to facilitate retrieval of the individual articles from the file.

Benefits

Author preparation of index entries produces two benefits. First, it obviates the need for indexing the author's article at the editorial facility, or by a bibliographic processing facility. Second, it should result in more accurate indexing, since the author should be the person most qualified to relate his article to the concepts in his field.

Problems and Limitations

Difficulties are more likely to arise with author indexing if no instrument of vocabulary control is used. Should the author have no guidelines, he may index his article at a level of specificity that is not useful for most readers. Also, without some kind of vocabulary control, there may be insufficient consistency among authors in the selection of descriptors.

These problems may be of such minor proportions that they never exceed tolerable limits. Moreover, the kind of guidance that authors need to index satisfactorily should not be difficult for the editorial office to provide. A list of accepted terms should be relatively easy to prepare, and there is no reason why authors need be limited to terms on the list. In other words, a hybrid approach to indexing, using both controlled and uncontrolled vocabulary, should be perfectly feasible and acceptable in most cases.

Applicability

There are few limitations on the applicability of author indexing. Obviously, it will be irrelevant to a journal that produces no indexes (although the index terms might be very helpful to bibliographic publications that cover the journal). A journal that uses a complicated thesaurus, or other form of vocabulary control, may find that its approach to indexing is too intricate for authors to use without special orientation. (In such a case, it might be well to re-evaluate the indexing approach, since it may be too complicated for readers, as well.) A journal that has no instrument of vocabulary control should not find it prohibitively difficult to develop one, particularly if it is merely to serve as a guide for authors indexing their own papers.

Management Considerations

The editor will need to prepare instructions to guide the authors in the assignment of descriptors. These instructions may be accompanied by an "authority list" (list of approved terms), and would be sent automatically to every author whose paper is accepted for publication. At the same time, provisions will have to be made in the filing system used by the editorial office for the accumulation of terms preparatory to the production of indexes. Assuming that the journal has been producing indexes in the past, these latter provisions will probably remain unchanged, since the only change will be in the source of the descriptors. Indexing personnel could be used for other tasks.

Source of Additional Data

A somewhat unusual approach to author selection of index terms, within the context of a computerized text-editing system, is described in:

"Computerized Text Editing and Processing With Built-In Indexing," by Vincent J. Ryan and Vinton A. Dearing; *Information Storage and Retrieval*, Vol. 10(5/6), May/June 1974.

Subsection I.3.

PUBLICATION DESIGN

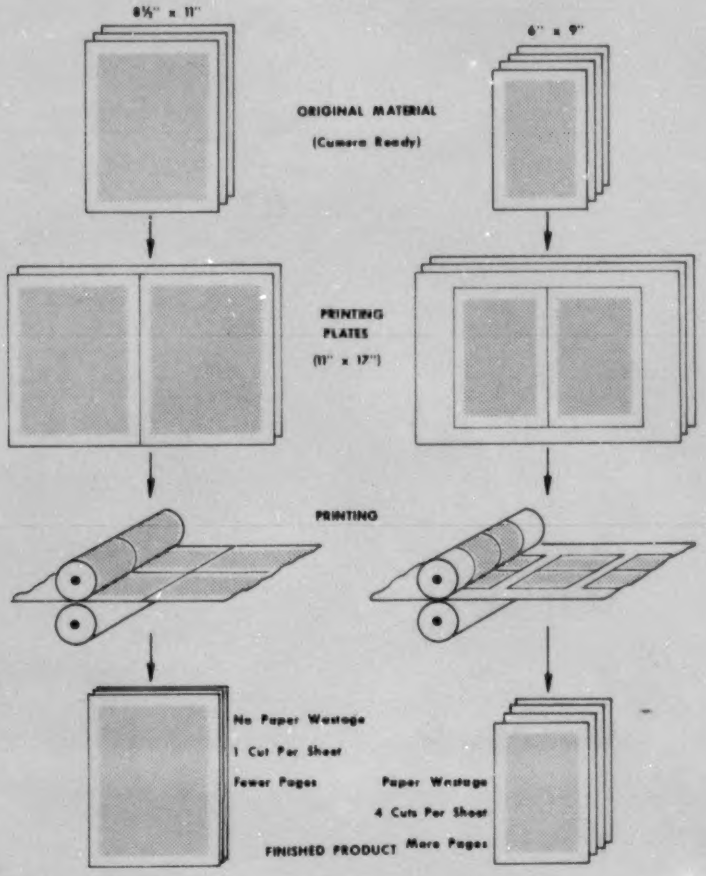
STANDARDIZATION OF JOURNAL SIZE

Description

Publishers of scientific journals should consider standardizing the physical size of their publications in two contexts. If they publish several journals, they must decide whether to make them all the same size; whether they publish one journal or several, they should have some rationale for the size(s) chosen.

An increasing number of journals today are printed on web-fed offset presses. The "basic" page size for most of these presses is 8-1/2" x 11"—that is, the rolls (webs) of paper, and the size of the presses, are such that the 8-1/2" x 11" page-image uses both paper and press to maximum efficiency. This size, then, is the most economical one for journals printed on these presses. Use of other sizes ("bastards") with web-fed presses requires either that the publisher order specially sized paper from a supplier, or that excess paper be discarded at the time of printing. In the latter case, the customer pays for the unused paper, as well as for the extra processing. If the press is being used to less than maximum efficiency, carrying less than its full capacity (see Figure 1), the running time for a given output will be longer than it needs to be. Consequently, use of a bastard size is costly in paper, presstime, and money.

Figure 1



It is important to understand that the foregoing applies *only* to modern web-offset presses. The "non-standard" sizes commonly seen in journal publishing (e.g., 6" x 9") derive from a period when most journal and magazine printing was done on sheet-fed presses, which came in a variety of sizes. Many of these are still in use: the publisher whose printer owns such a press, and who is able to conveniently obtain paper in the proper size, may be able to depart from the 8-1/2" x 11" norm without problems or extra expense. In fact, for him the "non-standard" size may be most economical. The important point is to use whatever size is most economical for the particular journal and printer.

Benefits

Adopting a single size for a portfolio of several journals will enable the publisher to realize certain economies. First, and most important, *all* processing, both in the editorial facility and at the printer's, will be enormously simplified. Second, he can buy paper in larger quantities, at a lower price than he would pay if he were buying paper in several different sizes. Third, the set-up for the printing of his journals will be less complicated, and therefore less expensive; this may be reflected in lower printing prices. Fourth, because of the possibility of buying paper in bulk, the publisher may be able to establish himself as a favored customer, and thus suffer fewer problems during times of paper shortage.

The benefit of using the 8-1/2" x 11" size–or whatever size the printer can best handle–is that it helps the publisher control costs.

Problems and Limitations

Many scientific journals are published in sizes other than 8-1/2" x 11". The reason for publishing in these non-standard sizes may be shrouded in the half-forgotten history of the founding of the journal and have nothing to do with present reality. Nonetheless, tradition acquires a certain weight in and of itself, and the publisher of a bastard-sized journal may find it difficult to contemplate change despite the clear advantages of another size. The problem here is not so much technical as social. In such a case, the Managing Editor should quantify the savings that can be effected by conversion to a standard format (the printer should be able to help here), and present the facts to the Editorial Board. If the difference in cost is significant, and if publishing costs are a matter of real concern, the case for conversion should make itself.

It may be argued that for a publication to change from, say, a 7" x 9" format to 8-1/2" x 11" would inconvenience and confuse subscribers. There may be some truth in this, particularly as regards libraries and institutional subscribers, whose shelving and display practices may be geared to a publication's size. The question, however, is whether this transitory inconvenience is not justified by a savings in the publishing budget which may, over the years, be very considerable.

Applicability

Adoption of the 8-1/2" x 11" format for publishing scientific journals should be considered by any publisher who does not now use it and whose printer could produce it economically, particularly if he produces more than one journal. (Minor deviations from the standard–e.g., 8-1/4" x 10-1/2"–need not be considered candidates for change.) In exceptional cases, there may be a special, overriding consideration which supports adherence to a non-standard size. For example, the utility of certain periodicals (such as periodical compilations of reference data) may depend on their appearing in a pocket-size format. The publisher of such a periodical, however, should be aware of what this convenience costs.

Management Considerations

Changing a journal's size may require that the publication be redesigned, particularly if the change in size is substantial. Actually, a change of this sort may provide a good opportunity for the publisher to review the publication's basic design, and make any changes that seem desirable. In any event, the publisher will do well to review the journal's design, to be sure that it is compatible with the new size.

The publisher should, of course, notify subscribers of the impending change, and explain why it is being made. Otherwise, no special preparation is required.

TABULAR ARRANGEMENT OF JOURNAL CONTENTS PAGE

Description

This is a somewhat unconventional way of arranging a journal's Table of Contents, designed to help people who are browsing find articles with greater ease. We have called this format "tabular" for want of a better term; so far as we know, there is no special designation for it. Figure 1 illustrates the difference between this format and a more conventional arrangement. In the tabular format, authors' names, page numbers, and article titles are all left-justified, each in a separate column.

Figure 1

A: Conventional Format

CONTENTS

Innovations in Conventional Journal & Monographic Publishing; T. L. Thompson	709
Editorial Processing; J. R. Doe and J. M. Smith	715
Publication Design; M. F. Cohen	722
Organization and Management of Operations; D. S. Taylor	729
Cost-Control, Pricing, and Financing; H. W. Anders and S. N. Morris	735
Print-on-Paper Alternatives to Conventional Publication; G. P. Wagner	743
Creation of By-Products; C. A. Smythe	751

B: Tabular Format

CONTENTS

T. L. Thompson	709	Innovations in Conventional Journal & Monographic Publishing
J. R. Doe and J. M. Smith	715	Editorial Processing
M. F. Cohen	722	Publication Design
D. S. Taylor	729	Organization and Management of Operations
H. W. Anders and S. N. Morris	735	Cost-Control, Pricing, and Financing
G. P. Wagner	743	Print-on-Paper Alternatives to Conventional Publication
C. A. Smythe	751	Creation of By-Products

Benefits

The benefit of using this format should be greater ease for the reader in scanning the Table of Contents page. This benefit might seem rather trivial when considered with reference to a single journal; if one considers the amount of time scientists spend in browsing through large numbers of journals, or *Current Contents* the benefit seems more significant.

Management Considerations

This format involves nothing more than the redesign of the Table of Contents page(s). The proposed format is neat and attractive, so reader acceptance should not present a problem.

BEGIN EACH JOURNAL ARTICLE ON A NEW PAGE

Description

Journal pages may be formatted so that articles run continuously through the document, or so that each article begins on a new page. Each arrangement has its advantages and disadvantages, but those of starting each article on a new page may be worth recapitulating.

Benefits

There are several advantages to beginning each article on a new page. First, it means that journal make-up can be modular, since each article becomes a separate unit. Each article can thus be separately composed, all the way through preparation of page proofs. Difficulties with a single paper will not hinder the schedule for production of an entire journal issue.

Second, starting each article on a new page benefits the reader, since it makes it easier to remove or copy an article from the journal for filing in a personal document collection.

Third, the preparation of offprints is facilitated and made more efficient, in that it requires no additional make-ready processing. Moreover, the appearance of the offprints is improved.

Problems and Limitations

The drawback to this format is that it uses more paper in the journal than does the continuous arrangement of articles. This problem can be partly offset by using the extra white space that the format creates for house ads, announcements, and other secondary material.

With a little reflection, the reader will realize that the important variable affecting the consumption of paper is the average length of the journal articles. If articles are short, starting each one on a new page may use considerably more paper. If, on the other hand, they tend to be long, the extra consumption of paper will be minimized.

Applicability

The ease that this format contributes to journal make-up should make it attractive for a great many journals. Its inefficient use of paper in the journal may be a major disadvantage if the journal's circulation is large. (The inefficiency becomes more serious with longer press runs; if the circulation is small, its impact may be negligible.) Even in the case of a large-circulation journal, this inefficiency may be offset if the journal does a very active business in the distribution of separates.

Management Considerations

No exceptional preparation or investment would be required to adopt this format, although it would probably involve some design changes in the journal. There would be no need to notify readers or authors of the change, unless the editor were particularly interested in their reaction to the new design.

The best way to assess the attractiveness of this format would be to actually try it, experimentally, for one or two issues. This experience will enable the editor to assess the impact of the change on both journal make-up and production costs.

VOLUME "YEAR" NOT DETERMINED BY CALENDAR YEAR

Description

Conventionally, journal issues cumulate into volumes that correspond to the calendar year (although the volume may not begin in January or end with December, it usually covers a twelve-month period). In the proposed system, however, this would not be so. A "volume" would consist of a certain number of issues, as usual, but these would be published strictly according to the availability of material. Thus, a 6-issue volume might be published in 6 months, a year, 18 months, or more. Within the same publication, the length of the volume "year" might vary considerably, according to the ebb and flow of manuscripts appropriate for publication. Subscriptions would be offered by volume, and the period involved would vary in the same way as the publication does.

Benefits

The advantage of publishing a journal in this way is that the schedule of publication could be made to synchronize quite closely with the rate of submission of acceptable articles. Thus, the journal's backlog could be carefully controlled. At the same time, during periods of scarce submissions the publisher would not be forced to lower standards of acceptability, simply to produce an issue of the journal.

Problems and Limitations

This system would inevitably confuse and inconvenience some subscribers, especially libraries and other institutions. Budgeting and ordering systems in libraries are almost universally established on the assumption that periodical subscriptions will run in 12-month increments. The system just described could make it very difficult for librarians to order a journal, keep track of their subscription to it, and re-order at the appropriate time. Such problems would be aggravated if the library used a broker for placing its journal subscriptions, since brokers, too, are oriented to 12-month subscription periods. Similar problems might arise with individual subscribers, although in this case the problem is more likely to be one of simple misunderstanding.

Another serious liability is that a journal published according to this system would be ineligible for second-class postage rates, so the cost of distribution would be much higher than for a conventional journal.

Applicability

Publishing a journal according to an irregular schedule would be most appropriate in very narrowly defined fields that involve small audiences. (If the audience were very large, the publisher might be overwhelmed by the necessity of dealing with the problems mentioned above.) In such a field, the absolute number of articles appropriate for publication is not likely to be very large, under any circumstances. Variations in the flow of manuscripts, although small in terms of absolute number, might significantly affect a journal which was published according to a fixed schedule. Consequently, conversion to an irregular schedule of publication might be quite helpful. At the same time, maintaining the status of "journal" (rather than that of "irregular series") might be desirable for publisher, author, and reader.

Management Considerations

Ordinarily, a journal's page budget is distributed over a specified number of issues that appear within a certain period of time. Thus, the editor can predict with reasonable exactness the number of journal pages that will appear in any period. In the case under consideration, however, this predictability does not exist. The editor should prepare a rough estimate of the journal's publication rate—that is, the number of pages to be published within a given period of time. He needs this estimate to define the number of issues per journal volume. Without such an estimate, the journal might be a publishing anomaly—a journal volume complete in only three months, or one requiring years to finish. In other words, the editor and publisher should have at least a rough notion of the flow of papers, in order to sensibly establish the size of one volume.

The publisher's printing arrangements will be different from those for most journals. The absence of a regular schedule should generally make this side of life easier, although the irregular journal may find itself occasionally shunted aside at the printer's in favor of tightly scheduled jobs. It is also possible that the lack of a strict schedule might affect the publisher's contractual arrangement with the printer.

The publisher will have to work continually to inform current and potential subscribers of the journal's irregular schedule. This will include notices in the journal itself, statements in promotional literature, notices included with renewal forms, and so forth. Even so, he should expect a significant number of inquiries and complaints, particularly from libraries whose subscriptions have expired without the librarians' realizing it. This will require that subscription information be readily accessible, and that the publisher have personnel who can handle such inquiries quickly, effectively, and diplomatically.

Subsection I.4.

COMPOSITION

STRIKE-ON COMPOSITION IN-HOUSE

Description

"Strike-on" or "direct-impression" composition refers to the preparation of composed copy by the use of any percussion device which creates a physical impression on paper. This category of composition is sometimes referred to as "cold type," to distinguish it from composition that involves the casting of hot metal. Several kinds of equipment can be used for strike-on composition. The typewriter is one example, although it has certain limitations when used as a composing device. There are other machines designed expressly for direct-impression composition (the IBM Selectric Composer, AM's Varityper, the Friden Justowriter). These devices have proportionally designed typefaces ("proportional spacing") and can produce justified right margins. In addition, they permit the user to select a variety of type styles in various point sizes. Their cost is modest enough to put the equipment within reach of many small organizations.

As we mentioned, the typewriter can also be considered a composition device. The appearance of typewriter-composed copy will not resemble copy that has been set by traditional means, by photocomposition, or even by the set of specially-designed direct-impression devices. As a result, some people may object to typewriter composition on aesthetic grounds. In recent years, though, attitudes have been changing: readers, authors, and editors attach less importance today to the strictly aesthetic aspects of scientific publication. This trend has accelerated as the costs of achieving the highest possible graphic quality have become more widely known and understood. Consequently, typewriter composition is finding increasing acceptance, even among some large, prestigious scientific publishers. To provide for special characters and symbols required in scientific publishing, modified versions of regular office typewriters have been developed; some typewriters that use interchangeable elements (such as IBM's Selectric series) can accept special elements, equipped with symbols commonly used in mathematics, physics, and chemistry.

Benefits

The benefits of using in-house strike-on composition are economy and direct control by the publisher of the composition process. The first of these is likely to have the greater impact, since composition accounts for a very large proportion of the total costs of scientific (short-run) publishing. Bringing the composition activity in-house may result in greater convenience, some cost savings, and reduction in processing time (since, for example, corrections may be more easily and quickly made).

Problems and Limitations

There are three general limitations associated with in-house strike-on composition: availability of special symbols and characters, graphic quality, and efficient use of paper.

Scientific publishing frequently requires the use of special characters and symbols. Some of these special characters are relatively common; others are used only in certain disciplines or sub-disciplines. The availability of these symbols with the kinds of equipment designed for strike-on composition should be carefully investigated by anyone contemplating the use of this equipment. It may be necessary to have such symbols specially produced, or drawn by hand and stripped into the composed text. If a device is employed which uses interchangeable typing elements, frequent changing of the typing element may be required. With other types of equipment, insertion of these special characters may be more difficult.

The graphic quality of text composed with direct-impression devices cannot equal that produced by hot-metal composition or by sophisticated photocomposition equipment, although higher-quality direct-impression composition can be produced now than was possible a few years ago. Devices that lack proportional spacing cannot produce justified right margins, resulting in a less polished appearance in the final copy. At the same time, their single-width letters are less pleasing in appearance than the output of a proportional-spacing machine. Even the machines that do have proportional spacing produce less polished output than do more sophisticated devices. The proportional spacing in low-cost direct-impression units divides characters into about four different widths; in monotype or high-quality photocomposition, there are twelve to fifteen different character widths. In addition, direct-impression devices (especially typewriters) lack the flexibility in leading (i.e., the amount of vertical space between lines of type) that is possible with more sophisticated equipment. This, too, affects the appearance of copy.

The importance of these aesthetic considerations should not be exaggerated. As we have already pointed out, the last several years have seen a growing awareness of the high cost required to achieve the highest physical and aesthetic quality in scientific publishing, and a growing willingess to compromise aesthetic values for economy, speed, and efficiency. In other words, greater stress is now being placed on the characteristics of scientific publishing that bear on its effectiveness as a means of communication; less attention is given to characteristics that are secondary to that function. As a result, such things as justified margins and elegant type styles do not seem as important as they once did.

There are other trade-offs, however, especially in the case of typewriter composition. The ability to justify right margins and vary the amount of leading results in more compact copy than can be achieved with a typewriter. It therefore uses less paper, so that some of the savings in composition may be lost in added paper cost (see Figure 1). The point at which the additional cost of paper exceeds the savings achieved by typewriter composition will be determined by the size of the print-run. In general, very short-run publications (under) 1500 copies) can save enough money through typewriter composition to more than make up for any additional paper consumed. As the size of the press-run increases, however, and composition declines as a percentage of total production costs, this savings becomes less significant, and efficient use of paper becomes a more important objective. In the case of the specially-designed strike-on composing devices with margin-justifying capability, the trade-off is not so clear-cut.

Figure 1

This example shows the relative compactness of composed text as compared to author-prepared camera-ready strike-on composition. Full-size copy produced in pica type fits 10 characters to the running inch, whereas copy composed in 10-point type fits 17.4 characters to the running inch. Line spacing with camera-ready strike-on composition may also be a factor, depending upon the degree of photoreduction used in producing the offset masters.

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When comparing the relative advantages of justified versus unjustified margins, there is another factor to consider. Corrections are more easily and inexpensively made with "ragged-right" (unjustified) margins than with justified ones. With justified margins, correction of a single word or line may necessitate recomposition of an entire paragraph; with ragged right, this is rarely so (see Figure 2).

Figure 2

The potential applicability of in-house strike-on composition is very wide. ~~Early~~ Previous applications have generally been cases in which this approach to composition was dictated by financial considerations; in some cases, typewriter composition makes publication feasible, where otherwise it would be out of the question. Because acceptance by readers of copy produced in this manner has generally been good, it seems logical to consider strike-on composition in cases other than those of dire hardship. Of course, the limitations referred to in the preceding section (difficulties in obtaining certain characters, graphic imperfections, and some inefficiencies in use of paper) must be taken into account in assessing the appropriateness of strike-on composition for any particular publication.

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Strike-on composition's applicability should not be considered limited to small publications or publishers. In fact, some very large scientific publishers have adopted it, after experimenting with more sophisticated systems, because of its practicality and low cost. In fact, a number of printing and publishing specialists feel that this constitutes a significant general trend in scientific publishing, and that the next several years will see a sharp increase in the incidence of in-house strike-on composition.

Management Considerations

Before trying to use in-house strike-on composition, the publisher should evaluate its ability to meet his needs, with particular reference to the limitations that we mentioned earlier. This kind of evaluation can probably not be done generically, for strike-on equipment varies considerably in features and design philosophy. Thus, the publisher will have to identify and evaluate specific pieces of equipment (CSG maintains files that may be helpful in this regard). Generally, this kind of equipment is somewhat more expensive than standard office typewriters, but less expensive than even inexpensive photocomposition equipment: a direct-impression composer may be expected to cost from $5,000 to $6,000. (As we have pointed out, however, the photocomposition equipment is generally more powerful. Moreover, a number of low-cost photocomposition devices can be upgraded with add-on equipment; strike-on equipment does not lend itself so readily to enhancement.)

Should the publisher determine that a strike-on device can work satisfactorily for him, he must decide whether to buy, rent, or lease the equipment. Unless the equipment is quite inexpensive, or specially modified for the publisher's purpose, outright purchase is probably not advisable. Rental and lease arrangements generally make provision for replacing equipment with newer, more sophisticated models as they become available. Since this is an area of rapidly developing technology, the option of obtaining new equipment as it is developed is important.

To use this equipment in-house, additional equipment will be needed for stripping in graphics and special symbols. This equipment need not be elaborate; a layout board or light-table, with appropriate tools, should suffice for most applications. Specially trained personnel will be required to operate the composition device, and to do the cutting and pasting required for page makeup. In some cases, these tasks might be performed by the same personnel, although the tasks are inherently different. The keyboarding should be done by a typist trained to use whatever device the publisher selects; the layout and make-up work should be done by a "board artist." Special training in the use of the strike-on composer may be offered by the equipment's manufacturer or sales organization.

The publisher will have to produce specifications and conventions for the keyboard operators to follow in setting copy. It will probably also be helpful to prepare special, blue-line paper to simplify adherence to these conventions. Since composition will be done in-house, it should be easier to monitor its quality and avoid deviations from the publisher's standards than it would be if the composition were being done outside the central editorial facility.

Source of Additional Data

"Typewriter Composition Cuts Journal Costs, Speeds Publication" by Robert H. Marks and A. W. Kenneth Metzner; *IEEE Transactions on Professional Communication,* PC-16(3), September 1973.

IN-HOUSE PREPARATION OF PHOTOCOMPOSITION INPUT USING WORD-PROCESSING EQUIPMENT

Description

In conventional publishing, a manuscript is typed, or "keyboarded" (which means the same thing, except that it may apply to equipment other than conventional typewriters), at least twice, and sometimes as often as six or seven times, before it is printed. Even so, some errors are not found, and some corrections are not made, until after all of this keyboarding, when proofs are corrected. This repeated keyboarding is expensive in itself, and necessarily introduces errors into the copy. One of the major advantages of computer-driven photocomposition systems is that their peripheral editing devices reduce the number of keyboardings required: material can be inserted, deleted, or altered, without affecting the rest of the copy.

Word-processing equipment has this same basic advantage. Word-processors are text-editing devices developed from electric office typewriters. A word-processor is essentially a typewriter to which a magnetic store (tape, cassette, disc, or card) has been added. This addition makes possible a number of functions that cannot be performed with a standard typewriter. Word-processors can be used for automatic typing (as in personalized form letters), other repetitive typing applications, and, in so-called "communicating" models, as terminals providing access to computer systems. Their widest application, however, is for text-editing. Although word-processors vary in flexibility and specific capabilities, it is safe to generalize that they permit the editing of rough draft into final copy without re-keyboarding any material except that which needs to be added or altered. After the editing has been done, the machine will automatically produce final copy by playing back the contents of its storage medium.

Word-processing equipment can be used to prepare input for computer processing systems. In this application, the word-processor's record is played through a special-purpose processor which converts its contents from the encoding system used by the word-processor to that of a computer. The translated information is recorded on computer magnetic tape, or some other medium commonly used for storage of computer-readable information (punched cards, punched paper tape, or magnetic disc). The information can now be processed by the computer. In the situation we are discussing, it could be used by the computer to drive a photocomposition device, producing composed copy on film or paper.

In computerized photocomposition, codes must be included with the copy to tell the computer how to treat the various parts of the copy. It is not always necessary to include all of these instructions when the copy is keyboarded, since most photocomposition systems have a certain number of standard formats which they will produce more or less automatically, with minimal commands. In the case we are considering now, the typesetting codes could be entered with the text, on the word-processing equipment, or a format could be assigned beforehand into which the material would automatically be set. Operationally, use of word-processing equipment to prepare input for photocomposition would involve re-keyboarding the author's manuscript once, in the central editorial office. It would be keyboarded there in the proper format, and with whatever codes might be necessary, for photocomposition. The editor's changes would be entered in this copy. A clean version would be played out on the word-processor and sent to the author, who would be told to make any necessary alterations. The author would send his copy back, with alterations indicated. These would be incorporated into the copy in magnetic storage in the editorial office.

The word-processor copy would then be transmitted to the compositor for phototypesetting. This transmission could take place in either of two ways. The cassette, cards, or discs could be sent by mail or other physical conveyance. Alternatively, if the editorial office's word-processing equipment were of the "communicating" type, it could relay the paper to the compositor's computer by telephone (the word-processor and the computer would each have to use an inexpensive device called a "modem," which couples an ordinary telephone to computers and other electronic equipment). The translation from the word-processor's code to computer code would be done at the receiving end, with the converter operating in tandem with the computer.

The compositor would run the translated materials through the photocomposition system, pull galley proofs, and send these to the editorial office. He would then immediately begin page make-up, without waiting for corrected galleys. (Some computerized photocomposition systems can perform page make-up automatically; in this case, the galleys would be bypassed entirely.) He would then send out the page proofs to the editorial office and the author. The author would send his alterations to the editorial office, which would decide whether they were admissible. The editorial office could return corrected proofs to the compositor, or use the word-processing equipment and transmit corrections in the same way that it had sent the original copy.

Benefits

This system should keep to a minimum the number of times that a paper need be keyboarded, thus controlling both costs and errors. At the same time, it should ensure that almost all changes and corrections would be made *before* composition, so that their cost would be kept down. It should speed the transactions between the editorial office and the compositor, and permit faster processing once material is in the compositor's hands.

Problems and Limitations

This system would be equipment- and system-dependent. That is, it would depend on the editorial office's having word-processing equipment capable of encoding materials for photocomposition, and this equipment would have to be compatible with the compositor's equipment and data-processing system. Furthermore, the compositor would have to have the equipment and software necessary to accept the output of the editorial office's word-processing equipment.

Even with a proper match of equipment and processing systems, there might be some limitations. Special characters, such as those used in mathematics, chemistry, and physics, might be difficult to represent with the word-processor, the photocomposer, or both. Photocomposition systems are able to produce many more of these than they could a few years ago, but they still have their limitations, and there remains the problem of representing these characters in the input from a conventional keyboard. Most generally, these characters are produced by using a control character to "escape" from the normal keyboard, followed by mnemonic combinations of several regular characters. This requires that the keyboard operator–in this case, the person operating the word-processing equipment–have special training beyond that required for basic operation of the machine, and that there be a "dictionary" of the special codes that may be required. In addition, there is always the danger of coming across a character that has not been provided for in the text-processing system. There are several ways of dealing with such a situation; the solution would have to be arrived at individually by the editor and compositor.

Applicability

This system's applicability is limited by the factors just discussed. Note that these factors operate independently of the size of the publishing operation. It is possible that a relatively small publisher would have a word-processor capable of interfacing with a photocomposition system (although if the publishing program were very small, it might not make financial sense to acquire a word-processor specifically for this purpose). Note, too, that the word-processor need not be dedicated to this use alone; it might be very useful in other publication-related activities, such as correspondence, reports, and the like.

The other part of the equation is the composition house. The photocomposition system must be capable of producing all of the characters and formats that the publisher requires, at a competitive price. If the publisher deals in material that includes a large number of special characters, the type of photocomposition system most likely to be able to satisfy his needs will be one of the "third-generation" machines. These devices are different from earlier phototypesetters in that they do not rely on mechanical elements (discs, drums, grids, etc.) to carry the fonts used in a typesetting job. Rather, all characters are represented by digital codes, which are stored in computer memory. As each character is needed, it is recreated on a cathode ray tube (CRT), similar to a television screen. Any character can be digitized and reproduced in this way, and the size of the character set is not limited, as in the case of a disc, drum, or other mechanical store of limited size. Special equipment is available for use with these third-generation devices, to digitize characters as they are needed. An added advantage of this class of equipment is that it operates much faster than the earlier electro-mechanical equipment; third-generation photocomposors can set thousands of characters in one second. A number of these devices are in operation in commercial printing establishments.

This system is probably *not appropriate* for any publishing operation in which manuscripts are not customarily re-typed in the editorial office.

Management Considerations

The publisher who wishes to consider using word-processing equipment to prepare input for photocomposition will have to educate himself about both types of equipment. If he is already using word-processing equipment, he should be able to learn through the manufacturer whether it is possible to convert his equipment's output into computer-readable form. At the same time, he should contact a number of composition and printing firms to find out what sort of equipment they use, and the forms of input they are prepared to accept. (CSG maintains files that may be helpful to someone wishing to pursue such a possibility.) After locating compatible equipment and systems, the publisher should acquire the word-processing equipment, have his operators trained in its use, and work out with the compositor the special requirements of the photocomposition system (codes for formats and special characters). To implement the system will require close contact and cooperation between the editorial office and the compositor. Once it is in operation, however, the relationship should be greatly simplified.

Sources of Additional Data

"In-House Composition: A Progress Report," by Joyce Kachergis; *Scholarly Publishing*, January 1975.

A Guide to Designing for the IBM MT/SC Typesetting System (With tips on Preparing Copy for the Typesetter), by Joan K. Graham; A special document prepared by Tech Type Graphics Corp. for presentation at the 1975 IEEE Conference on Scientific Journals held at Cherry Hill, NJ, April 1975.

PHOTO-OFFSET FROM COMPUTER PRINTOUT

Description

A computer line-printer (or printing terminal, for that matter) may be used as a direct-impression composer. Within the last few years, a number of scientific books and monographs have been printed from plates made by photographing line-printer output.

The print-chains now in use on line-printers and teletype terminals produce output of much higher graphic quality than was available a few years ago. Moreover, some word-processors can be used as terminals with time-sharing computer systems; when these are used as output devices, the appearance is at least equivalent to that of normal typescript.

Figure 1

This example was generated on a Communicating IBM MC/ST, using a 12-pitch, Letter-Gothic element, printing in the 10-pitch mode.

Asking authors of scientific articles to select index terms for their papers is not really new, in that some journals have been doing this for years. It has not yet become general practice, however, and it deserves consideration for many journals that have not yet tried it. The concept is quite straightforward; authors of accepted articles are asked to supply a list of descriptors (index terms) with the clean copy of their manuscript. These terms might be ones that the author selects from a list of approved descriptors provided by the edi[illegible]his is called a "controlled vocabulary"), or they mig[illegible] "keywords," freely selected by the author ("uncontr[illegible] vocabulary"), or some combination of the two. The editor might, if he wishes, limit the number of terms that the author may assign to his article. (An alternative approach would be to instruct authors to submit up to a certain number of keywords with their original manuscripts. Reviewers who referee each manuscript would also review the keywords selected, so that the descriptors finally applied to the manuscript would be ones which carried the weight of professional consensus.)

Benefits

The advantage of using line-printer or terminal output as camera-ready copy is that it avoids any further processing between creation of a data base and preparation of plates for offset printing. The result is that the publishing cycle is speeded up, costs are reduced, and quality control is improved, since there is no opportunity for introduction of errors through re-keyboarding.

Problems and Limitations

The major limiting factor in this type of composition is the output device. For economy, a line-printer is the preferred device, since it may be used to print off-line. The appearance of the finished copy will depend on the quality of the print-chain and the output software used by the system. ("Hyphenation routines" are now included in the output software for many computer systems; this helps the appearance of the copy.)

More important than the graphic quality, though, is the output device's ability to produce special signs and symbols (mathematical symbols, Greek letters, etc.), and to locate both ordinary and special characters in formats required by scientific exposition (as in superscripts, subscripts, and equations). Line-printers and teletype terminals are available with expanded or extended print-chains, with some special capabilities for formatting output. In both areas, however, they are still distinctly limited. Thus, copy containing a great many non-standard symbols, or requiring much non-linear formatting, would probably not be a good candidate for this type of composition.

Applicability

This approach to composition makes sense *only* if there is another reason for processing by computer the copy that is to be published. Usually, material that is processed in this way will be re-used several times, and will require extensive revision or updating before each re-use. The computer can facilitate this.

This criterion is much more likely to be met by books or monographs than by journals, and, in fact, most line-printer composition has been for books. Moreover, these books have been on topics in rapid change and development, in which the ability to update and revise was very important.

One further fact is worth mentioning. All of the cases we have seen in which books were composed in this way involved organizations in which the publications office had ready access to a computer system that was maintained by the institution as a whole. In other words, an in-house data-processing facility, not charged to the publishing operation, may be another prerequisite.

Management Considerations

The publications manager should exercise care to see that this type of composition is used only in cases in which it is actually appropriate, according to the criteria we have mentioned. There is a temptation to use computers in publishing for their own sake, without regard to the problems and costs that they introduce. It is just as dangerous to succumb to this temptation as it is to phobically avoid computer processing.

The editor must be sure that the computer text-processing system he uses can handle the input, processing, and output requirements for the copy he wants to produce. This is particularly important if the copy contains many non-standard characters and symbols, or involves output formats outside the capability of most line-printers.

UNJUSTIFIED RIGHT MARGINS

Description

In traditional, high-quality publishing, copy is both left- and right-justified. In recent years, with the growing use and acceptance of typewriter and other types of strike-on composition, the finished appearance that the justified right margin gives has seemed less and less important. By now, most of us have seen numerous technical reports, an occasional journal, and even a few books with unjustified right margins (this Guide is an example). Figure 1 shows the difference between copy with a justified right margin and that in what is sometimes called "ragged right."

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Benefits

The advantage of using an unjustified right margin is that it permits the publisher to use inexpensive composition, mostly of the direct-impression type. Some direct-impression devices (such as the office typewriter) cannot produce justified right margins at all. Others (such as proportional-spacing typewriters, and inexpensive strike-on composing machines) can justify the right margin, but to do so must process each line of type twice. This is so much more expensive than ragged right that many organizations that use these devices rarely use them to produce text with justified right margins.

Another advantage of ragged right is that corrections are easier and less expensive to make than they are in copy with justified margins. If the right margin is justified, one small correction may necessitate recomposing an entire paragraph (see Figure 2); with "ragged right," this can often be avoided (SEE: I.4.1–Strike-On Composition In-House, Figure 2).

Figure 2

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Problems and Limitations

Some editors and readers still object to unjustified right margins on aesthetic grounds. The number of readers voicing this objection is likely to be quite small. Moreover, this argument is likely to seem weak if the publisher can realize a significant savings by changing to ragged right.

Unjustified right margins do have one genuine drawback: they tend to use more paper. This limitation is less true of ragged right produced on a special composing device than it is of typewriter composition (because the composers have variable-width letters, and can vary the amount of leading, or space between lines, more than typewriters can). As a general principle, nonetheless, the limitation holds. Thus, if the press-run is to be long, the increased consumption of paper may offset the savings in composition.

Applicability

Adoption of unjustified right margins—and the inexpensive methods of composition that produce them—should be considered for a great many scientific publications, including journals, monographs, and books. Most scientific publishing involves short press-runs, so the limitation that we noted above would apply in relatively few instances. Most of these would be large-circulation journals produced by large scientific societies. For smaller journals (even those produced by large societies), composition systems that produce ragged right offer the publisher an attractive option for controlling costs.

Management Considerations

The editor or publications manager is likely to encounter much less opposition to the adoption of unjustified right margins than he would to most other changes that would offer a comparable reduction in the cost of publishing. The specific requirements for implementation will depend on the particular system of composition that the manager selects.

Sources of Additional Data

"What's So Sacred About Justified Composition?" by James Allen Carte; *21st Proceedings of the Society for Technical Communication*, May 1974.

"Is Justification Justifiable?" by James Allen Carte; *Technical Communication*, First Quarter 1974.

"Experiments With Unjustified Text," by James Hartley and Peter Burnhill; *Visible Language*, Vol. 5(3), Summer 1971.

"Typewriter Composition Cuts Journal Costs, Speeds Publication," by Robert H. Marks and A. W. Kenneth Metzner; *IEEE Transactions on Professional Communication*, Vol. PC-16(3), September 1973.

LINEAR FORMATTING OF MATHEMATICAL EXPRESSIONS

Description

Traditionally, mathematical expressions have been formatted in blocks, with certain functions expressed vertically, and others horizontally (see Figure 1). In recent years some publishers have begun to adopt a "linear" (horizontal) format for all such expressions (see Figure 2).

Figure 1: Block-Style Format

$$\frac{V\ opt}{V\ prop} = \frac{(\Sigma W_h \sqrt{P_h Q_h})^2}{\Sigma W_h P_h Q_h}$$

Figure 2: Linear Format (the same equation)

$$V\ opt\ /\ V\ prop = (\Sigma W_h \sqrt{P_h Q_h})^2 / \Sigma W_h P_h Q_h$$

Benefits

The major benefit of using a linear format for mathematical expressions is that it uses much less space than the traditional block style. This saves paper and reduces the cost of publishing mathematical material. A secondary benefit is that the linear format is easier to compose, particularly with computer-driven photocomposition systems. Consequently, the linear format can reduce composition costs or make possible the use of composition systems that could not handle the traditional format.

Problems and Limitations

The editor may encounter some resistance among authors and readers, although editors who have actually adopted this format say that such resistance has been very slight. Some mathematical expressions may become less intelligible when they are translated into the new format. If the loss of comprehensibility is serious, it will be better to compose this material in the traditional style. A conversion to the new format need not be total for the benefit to be realized.

Applicability

Horizontal formatting of mathematics may be of interest to any publisher who produces sizeable amounts of mathematical copy. Its potential benefit increases according to the ratio of mathematics to text, and is particularly important for cases in which it would be desirable to embed the mathematics in the text.

Management Considerations

Authors must be instructed to submit their mathematical material in the new format, so a statement to this effect should be included in the journal; instructions for the proper way of using the format should be included in the publisher's manual for authors. It is preferable that re-formatting *not* be done in the editorial office, since this could lead to distorting or mistaking the author's intent. The editor may wish to announce the adoption of the new format in an editorial, for the benefit of the readers. Central editorial-office personnel, editors, and reviewers will all have to understand the change and be familiar with any new requirements that it brings for the preparation of copy.

ELIMINATE LINE-END HYPHENATION

Description

Line-end hyphenation is used to indicate that a word, begun on one line, will continue onto the succeeding line. It is used when the word would exceed the limit placed on the length of the line on which it began. Division of words in this way follows strict rules of syllabication. Computer text-processing systems have developed large libraries of hyphenation routines and "dictionaries," or collections of words with instructions for their proper hyphenation.

Some publishing experts have suggested that these procedures are not really necessary for scientific and technical publications, and that they cost much more than they are worth. They point out that we do not read scientific or technical documents in the same way as general prose or fiction, and contend that we could tolerate unregulated word breaks in scientific prose, whereas we probably could not in other types of material.

Benefits

Abolition of hyphenation procedures would, although it seems trival, bring several benefits. It would save time (and, therefore, money) in composition and editing; at present, editors and compositors, whether mechanical or human, must spend a certain amount of time verifying the correct syllabic division of words. In low-cost strike-on composition systems, adherence to this convention requires that each line of type be processed twice to produce justified right margins. And on some equipment, such as the standard typewriter, justified margins cannot be produced at all.

Conversion to unregulated word breaks would change this. It would make it possible to produce justified margins with any device, including office typewriters, permitting a much more efficient use of paper (justified margins use less paper than "ragged right"). Overall, it should make typewriter composition much more attractive and practical, since, with a justified right margin, it would be possible to photo-reduce full-size typewriter copy and arrange it into a two-column format, without concern for the appearance of the gutter (the two-column format is generally more readable than a single-column format on an 8-1/2" x 11" page, but it is awkward if the right margin cannot be justified).

In sum, then, abandonment of regulated word breaks would lead to much more efficient use of paper with low-cost approaches to composition, thus doubly reducing the cost of publishing.

Problems and Limitations

This change would undoubtedly meet a great deal of opposition, particularly among editors. It would overturn a tradition that we are all used to, and editors are, almost by definition, guardians of tradition in language and style. To make matters worse, this change would be one which involves relinquishing a convenience, and would replace an orderly system with a disorderly one (linguistically, if not graphically).

This resistance would probably have little to do with the actual merits of the case. Figure 1 shows two samples of typewriter-composed text: one using unregulated word breaks, and one hyphenated in the conventional way. Bearing in mind that we do *not* read technical prose as we would read a novel, the unhyphenated sample does not seem markedly less intelligible than the hyphenated one.

Figure 1

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     Line-end hyphenation is used to
indicate that a word, begun on one
line, will continue onto the suc-
ceeding line.  This is done when the
word would exceed the limit placed
on the length of the line on which
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tions for their proper hyphenation.
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To be sure, there are times when the convention of hyphenating broken words makes a difference in their meaning: the words *avoid, island, onto,* and *intake* could be ambiguous if they were broken as *a void, is land, on to,* and *in take.* No doubt there are a number of words that would fall into this category. They need not present an insurmountable problem, however. The fact that these words were to be continued could be indicated by underscoring the last letter before the break, thus: a void, is land, on to, and in take. (In fact, the underscore is used in some European languages in place of the hyphen.)

Applicability

Abolition of conventional hyphenation would be most appropriate for publications that use strike-on composition, or for which this type of composition would be desirable.

Management Considerations

The manager's most difficult task will probably be to persuade editors to accept this idea. He may have better success if he proposes to implement it experimentally, or on a limited basis, to see how readers will react. With the help of his printer, he may be able to develop some cost comparisons that would give some idea of the potential savings in composition and paper. Such information should be useful for dealings with both editors and readers. Some readers are bound to express great unhappiness at the change. This reaction may be minimized, however, if the change, and the reasons for it, are clearly announced beforehand, and the implementation is gradual.

Typists and copy editors may have some difficulty in adjusting to the change; this should be temporary and easily survived. Authors may present a somewhat greater problem, although their reaction is likely to parallel that of readers: some will be enthusiastic, a few will be outraged, and most will simply learn to live with the new arrangement.

Source of Additional Data

"The Use of the Hyphen in Printing to Indicate Divided Words," by F. M. O'Hara, Jr.; *Visible Language*, Vol. 5(2), Spring 1971.

MIXED COMPOSITION IN A SINGLE PUBLICATION

Description

Composition may be varied within a single publication in several ways, and for several reasons. A certain amount of mixing of type styles and sizes (e.g., roman and italic, serif and sans-serif) is quite conventional. This mixing is done to give the copy a pleasing appearance, to give prominence to certain material, and to maximize legibility. By "mixed composition" we mean both mixed type styles and mixed approaches to composition (photocomposition, typewriter composition, and other strike-on composition), undertaken, not for aesthetic reasons, but for the publisher's convenience and to control costs.

Some examples should help make clear what we mean. One scientific publisher annually produces a reference volume whose contents are invariably compiled at the last moment, under great pressure. Some of the material does not become available until the printer's regular deadline for composition is past. The publisher has this material composed locally on a catch-as-catch-can basis, then sends it to the printer for photographing and plate make-up. This later material will differ in appearance from the rest of the publications' contents, but without this arrangement, it would not appear at all.

Another publisher (a very large, prestigious one) regularly uses several types of composition in his journal articles. The title, author's name, and abstract are produced by a computerized photocomposition system, so that they can be used to automatically prepare bibliographic publications and to create a bibliographic data base. (In this case, the photocomposition system is desirable because it enables the publisher to process the material only once for multiple applications.) The article itself is composed on a typewriter, to which has been added a mechanical attachment that provides a number of special characters. The list of references at the end of the article is typed on another typewriter, without this attachment. Thus, three distinct types of composition are used on the article; the components are stripped together when pages are made up.

Benefits

Mixing composition within a single publication permits the publisher to "modularize" the composition function. This should result in greater flexibility than the conventional approach offers, and in the ability to control composition costs rather closely, since, for each module of copy, the most appropriate composition capability is used. To return to one of our earlier examples: the publisher who uses the three-pronged approach says that to use the photocomposition system throughout each paper would cost more than $45 per page. Composition using the modified typewriters, on the other hand, costs less than $30 per page. At the same time, using the photocomposition system for the title, author, and abstract results in economies in bibliographic processing and re-publication, so that its use in that part of the paper is justified. In other words, the publisher has optimized his approach to composition by considering his journal not as a single composition job, but as a collection of modules, each with different requirements.

Problems and Limitations

The most obvious objection to this approach to composition is based on aesthetics. Mixed composition will result in copy that is not consistent in appearance. This is true, at least to an extent, but it immediately raises the counter-question, "Does that matter?" Attitudes toward scientific publication have changed considerably over the last several years, in the direction of greater concern with the functional effectiveness and efficiency of publication as communication, and less concern with its secondary attributes. Thus, aesthetic arguments against all sorts of departures from traditional practice which result in a publication of less than ideal appearance have lost weight, and continue to do so.

Although this shift in attitudes has been underway for some time, the current state of the economy has done a great deal to accelerate it. Organizations that once would have refused to do anything that would compromise the appearance of their journals have been forced by economic pressures to make changes that have had just this effect. The have learned, generally, that the result was not as bad as they had feared; they have been able to reduce costs, and reaction from authors and readers has been mild, at worst. One beneficial result of this is that scientific publishers–and particularly the scientific societies–have become somewhat more receptive than they used to be to the idea of change and innovation in general.

A more pertinent limitation to mixed composition is that it can present "systems" problems. If one article is being composed in three pieces, by three systems, the whole process must be carefully organized and managed to make sure that nothing is lost or overlooked. Additionally, the publisher must realize that although the schedules for the various modules of copy may vary, they must be coordinated, so that the modules can be assembled at the proper time.

Applicability

In principle, the idea of mixed composition should be applicable to many journals. The actual amount of savings and other benefits, however, would vary widely from one journal to another. The only way to determine its appropriateness is through a case analysis.

Management Considerations

To determine whether mixed composition would be worthwhile for a particular journal, the managing editor should perform a "systems analysis" of his journal. This will revolve around answering a series of questions, such as:

Can the journal be broken apart into modules?

Are some sections much more difficult (or much easier) to compose than others?

Do some sections have greater archival value than others?

Does the composition of certain sections regularly take longer than that of the rest of the journal?

Are any portions of the journal regularly re-used for other publications or for special processing?

By analyzing the journal in this way, the editor can determine whether the type of composition he has been using is really adequate and necessary for the entire job. Should he find that it is not, he can begin to consider ways of breaking the process up, using for each component the type of processing that is most economical, while providing the needed output. In doing this, he should consider a variety of processing alternatives: computerized photocomposition, other types of photocomposition, and strike-on composition using various types of equipment—typewriters, word-processing equipment, and special strike-on composers.

PHOTO-OFFSET PRINTING PLATES FROM COMPUTER OUTPUT MICROFILM

Description

Computer output microfilm (COM) is, as its name suggests, microfilm produced directly by a computer. As a form of output and storage, it has certain advantages over more commonly used media. COM can be created about 20 times as fast as line-printer printout. It is much more compact and less expensive than magnetic tape, and is far less critical of handling and storage conditions. Conventional COM does require development (since it is photographically produced), but this process is very rapid; newer types of COM have recently been developed, which are produced by lasers, and require no development. All in all, COM can be very quickly and inexpensively produced by computer systems that have the necessary equipment.

Equipment is now available which accepts COM as input, and automatically produces plates for offset printing. The processing is rapid (about 15 plates per minute) and economical.

Benefits

This technology provides a rapid, inexpensive approach to the dissemination of information in computerized files, for those who have access to the appropriate equipment.

Problems and Limitations

At present, this approach to offset printing requires access to equipment that is not widely available. First,one must have access to a computer system capable of producing COM. Such systems are not yet in general use, although production of COM has been steadily growing over the last several years. The more serious scarcity is in the platemaking equipment: this is quite new and has yet to be widely distributed. (It is possible to create plates for offset printing without this special equipment, but the process involves producing a blow-back from the COM, and producing a plate from that; this is a slower, more complicated process, and the resulting plate is of lower quality than the one produced by the special equipment.)

The image on the plate produced in this way is only of modest quality. It lacks the sharpness required for magazine work or other jobs that require the best possible appearance. This would not necessarily preclude its use for the publication of scientific information, but might make it unsuitable for use in the production of an archival publication for a large audience.

Applicability

The appropriateness of this approach to composition depends less on the special processing used to produce photo-offset plates than on the desirability of creating and maintaining a computer-manipulable data base with COM capabilities. Most applications of this sort are limited to what is usually called "data base publishing"–directories, parts lists, inventories, and the like. All of these derive from large data bases that must be frequently updated and republished. In the primary dissemination of scientific information, the most appropriate applications would probably be to the preparation of catalogs for large systems for the selective dissemination of documents (SDD).

Management Considerations

The manager who is interested in investigating this approach to composition should first investigate COM technology in general, for orientation. He then should try to find a service bureau whose system can handle his data-processing requirements, and can produce COM. He then should locate a processor with the special equipment that converts COM to photo-offset plates, and obtain samples of this equipment's output, to see whether it will produce plates of high enough quality to satisfy his needs.

Source of Additional Data

"Photocomposition on a COM Recorder," by Larry Schieber; *Journal of Micrographics*, Vol. 8(5), May 1975.

Subsection I.5.

REPRODUCTION

OPTIMIZE SELECTION OF PAPER STOCK FOR JOURNAL PRINTING

Description

The cost of paper is a large and growing portion of the total cost of scientific publishing. With the price of paper already high and steadily rising, it is increasingly important that the journal editor understand how to optimize his selection of paper. In making his selection, he must weigh and balance three general factors: technical characteristics ("runnability" and print quality), aesthetic qualities, and economy.

To strike the best balance among these considerations, the editor should learn as much as he can about paper, especially as it relates to the printing of his own journal(s). The time that he invests in this may translate into reduced printing costs.

In the limited space we have here, we cannot provide a detailed description of the different kinds of paper, their costs, uses, and characteristics. We can, however, present some ideas and principles that are used by sophisticated scientific editors, and which would be useful to others.

First, the editor or publisher is faced with a basic trade-off when he selects paper: appearance *versus* cost. (Actually, this principle applies to much more in scientific publishing than the mere selection of paper. Publishing experts say that it applies to almost everything one can do to produce a scientific journal.) The important thing to realize in selecting paper is that the price curve and quality curve are not parallel: a relatively small difference in the quality or appearance of two paper stocks may be accompanied by a very large difference in price. This makes it especially important that the publisher select the lowest-quality, least expensive paper that will suit his purposes.

Experienced printers and editors say that it may be *very* expensive for the editor to specify the paper stock he wants to use. He will be far better advised, they say, to make a selection from one of his printer's "house stocks"; the difference in price can be substantial.

Journals in certain fields find it necessary to print substantial numbers of halftone or color illustrations. In addition to requiring additional, expensive processing, these illustrations must be reproduced on higher-quality, glossier paper than is required by straight text or line illustrations. In such a situation, the publisher is tempted to print the entire journal on the more expensive glossy paper. This, however, is unnecessary.

The better solution is to segregate the contents of the publication into text and halftones. The two are then separately printed—the section with halftones on coated (glossy) paper, the text on uncoated—and bound together. Alternatively, the articles could be rearranged so that all halftones are together; the journal could then be printed as a single, continuous publication, but with certain signatures (those including halftones) printed on glossy paper. Both of these approaches result in using the more expensive paper only where it is actually needed.

Benefits

The journal for which papers are selected in the way we have described will have the physical quality required by its contents, at the most modest possible cost.

Management Considerations

It is not possible in a brief article to answer all of the questions that can and should be asked about the paper used for scientific publishing. The important thing, as we mentioned at the beginning of this entry, is for the editor or publisher to educate himself about the requirements of his own operation, and about the types and prices of paper that could be used in it. Printers tend to be very accommodating: if a publisher specifies a certain paper for a journal or book, the printer will almost certainly supply it. With a little research and inquiry, the publisher may learn that other, less expensive stocks would serve his purposes just as well, or that he might intermix stocks so as to minimize the cost of specially processed material.

Source of Additional Data

The reader will find an excellent introduction to paper, as well as to many other aspects of the graphic arts, in the International Paper Company's *Pocket Pal.* This little book, first produced in 1934, is now in its eleventh edition. It is clearly and interestingly written, and is an excellent introduction and reference work for the layman who finds himself forced to cope with the mysteries of printing and publishing. At $1.50, it is also a bargain; it may be ordered from the

International Paper Company
220 East 42nd Street
New York, N.Y. 10017

Subsection I.6.
DISTRIBUTION

THROW-AWAY COVER FOR JOURNAL MAILING

Description

A few journals have recently begun to use kraft paper as a discardable outer cover for protection while in the mails. The cover is saddle-stitched onto the outside of the journal, as if it were a second cover sheet; the reader, when he receives the journal, merely tears off this outer cover.

Benefits

There are two advantages to be realized from this method for the protection of journals during mailing. First, it eliminates a processing step. The addition of the kraft-paper outer cover can be integrated into the binding process. This eliminates the necessity of inserting the journals into mailers for distribution.

Second, the aesthetic quality of the journal's cover art would not be spoiled by the affixation of a mailing label, since this would be attached to the throw-away cover.

Problems and Limitations

Because this type of cover would not completely enclose the journal, it would not prevent it from opening and being damaged during postal handling. Except in unusual circumstances, this is probably not a serious drawback.

Applicability

This type of packaging can be used only with journals that use saddle-stitch binding. With perfect binding, the outer cover would have to be glued to the journal, which would create problems. Thus, the thickness of the journal is a limiting factor.

JOURNAL MAILING WITHOUT SPECIAL PACKAGING

Description

Placing journals in special packages before mailing them to subscribers adds appreciably to the cost of publishing. It actually makes a difference in the journal's condition, however, in very few cases. Increasingly, publishers have tried mailing magazines and journals without special packaging.

Benefits

The sole reason for mailing without special packaging is to reduce the publisher's costs.

Problems and Limitations

Protective packaging for documents delivered through the mail is a kind of insurance: it is seldom needed, but when it *is* needed, it is important. The publisher who abandons the use of protective packaging may find that the number of mishaps is small, but when they occur, readers are likely to be extremely unhappy.

Logically, it would seem that the greater the distance a journal issue travels, the greater the possibility of damage. On the whole, this may be true, but many particular experiences defy the principle. The publisher who plans to eliminate protective packaging should probably do so wholesale, rather than selectively, by destination.

Management Considerations

The publisher who stops using protective packaging should be sure that he can satisfy requests for replacement issues from subscribers whose copies arrive damaged. He should arrange bookkeeping procedures to allow him to monitor the cost of this, and compare it with the cost of protective packaging. For purposes of general comparison, we offer the following round figures. Cheshire labels, applied to the journal without any other packaging, will cost about $11 per thousand copies. A kraft-paper cover, with a Cheshire label applied to the outside, will cost approximately $30 per thousand copies. Insertion of the journal into an envelope or sleeve, with the label applied outside, will cost approximately $50 per thousand copies. These figures, of course, will vary somewhat, depending on the size of the mailing. The cost of replacing damaged journals will, of course, vary from one case to another.

BULK AIR-TRANSPORT OF JOURNALS OVERSEAS FOR DISTRIBUTION BY LOCAL MAIL

Description

As an alternative to direct mailing of journals to overseas subscribers, the journal publisher could establish a contract with an overseas airline for the transport in bulk of labelled journals to distant locations (such as Japan and Europe), where they would be sent to subscribers by local mail.

Benefits

This practice should result in much faster delivery of journals to foreign subscribers than can be achieved under conventional systems. Under certain circumstances, it could also save money (see next section).

Problems and Limitations

While this system would be faster than usual arrangements, it would probably cost more, if the publisher paid for both the transport and the mailing of the journal. If the journal to be distributed in this way is published by a scientific society, however, it may be possible to arrange for a counterpart society in the country of destination to pay for the local mailing. In such an arrangement, the publisher would save both time and money.

Applicability

This practice would be most appropriate for journals that place high priority on the currency or timeliness of their information content. Furthermore, it would be most appropriate for journals with large numbers of foreign subscribers. If the number of foreign subscribers were small, the trouble and expense involved with negotiating a contract for bulk transport might not be justified.

Management Considerations

The publisher should go through two steps before adopting a bulk air-shipment system. First, he should research its feasibility and appropriateness for his journal. He should consider whether he has enough foreign subscribers to make the scheme worthwhile, and how important it is for them to receive journals promptly. He should try to determine the average length of time that foreign subscribers wait to receive their copies of his journal, and how much this delay could be reduced by the system we are describing. He should contact several airlines to find out what a contract might involve, what services could be obtained (such as "space-available" shipping at a discount), and what they would cost. He should translate the cost of this service into a charge that could be passed on to the foreign subscribers. He should also carefully investigate postal regulations in the country of destination to see how they might affect his plans.

When the results of this study are in hand, the publisher should try to determine the level of interest among foreign subscribers in faster delivery. This might be done through a small survey, or by collecting anecdotal information. If the plan seems feasible, and it seems that subscribers will be interested in it, the publisher could make it an experimental subscription option. That is, it could be offered for a certain length of time–perhaps a year—at a price added to the basic subscription, without committing the publisher to continue it beyond the trial period. As a further limitation, it might be offered to subscribers only in certain countries. If, at the end of the trial period, the plan has worked well and response has been enthusiastic, the publisher could continue and expand it.

ORDERS FOR REPRINTS CHARGED TO CREDIT CARD

Description

In this system, the publisher would arrange with a credit-card company to permit readers to charge their orders for separates to their credit-card accounts. The reader who wished to buy a reprint or other publication could then place his order by mail or by telephone. On the publisher's order forms, a space would be designated for the reader's credit-card number. Alternatively, the reader could call the publisher, give his card number, and order any document. The publications office would process the order, and forward a copy to the credit-card company.

Benefits

The establishment of this system would make it much easier for readers to place orders, particularly if the option of ordering by telephone were available. This should encourage readers to order more documents, with the result that the publisher's sales should increase.

Problems and Limitations

With any system of this type, mix-ups in billings inevitably occur. It is also inevitable that there will be some fraudulent charges and defaults on payment of legitimately placed orders. In all of these cases, the vendor (in this case, the publisher) is protected, since the credit supplier has purchased the obligations. The publisher's problem will arise in cases in which persons who have used their credit cards to order documents encounter difficulty either in delivery of their orders, or in their billings. In either case, they may hold the publisher responsible.

Applicability

This system might be worth investigating for publishers who do an active business in selling reprints, monographs, and other separates.

Management Considerations

The manager who wishes to investigate this type of system should contact several major credit suppliers. In their "standard" contract for this type of arrangement, they receive 5% of the gross value of the goods or services sold. This figure, however, can often be negotiated downward.

If the publisher establishes the system, he should have his order forms re-designed, to accommodate credit-card numbers. If he decides to make available the option of ordering by telephone, he should include instructions for this in each journal issue, as well as in all promotional materials. If he is to make this option available, he may find it desirable to obtain a WATS line, so that readers may call toll-free. (He will want to amortize the cost of this in pricing his reprints and other separates.)

SOCIETY-COORDINATED AUTHOR DISTRIBUTION OF MEETING-RELATED PAPERS

Description

Most societies, when they sponsor a meeting, assume responsibility for reproducing and distributing the papers that will be presented or discussed there. This can be both expensive and time-consuming, and the schedule of reproduction and distribution often becomes very hectic. An alternative to the usual approach is to make the authors responsible for reproduction and distribution of their papers, with the society coordinating the process.

In this approach, authors are advised in advance that they will be responsible for reproducing and mailing copies of their papers early enough so that everyone attending the meeting will have them in hand before the meeting takes place. After a paper has been accepted, and the society has completed the meeting's mailing list (names and addresses of all persons planning to attend, plus any other persons who should receive copies of the papers), the society sends each author a set of mailing labels containing every name and address on the list. The author is then responsible for reproducing his paper in quantity and for sending copies to persons on the mailing list. If the list is long, he may choose not to mail to everyone on the list; this decision is his. In cases of extreme hardship, the society may help the author by paying the cost of postage.

Benefits

This plan benefits the society and the persons who will attend the meeting in several ways. First, it reduces the society's expenses in sponsoring the meeting. It also reduces the demands placed on the society's staff and other persons concerned with planning and managing the meeting, freeing them to devote more of their time and energy to the meeting itself, rather than its documentation. It should also significantly improve the speed with which papers are sent to persons who will attend the meeting. Since responsibility for disseminating his paper rests squarely with the author, his motivation for getting it into final form, reproducing it, and mailing it should be increased. When authors send their papers to the sponsoring society for reproduction and mailing, they often procrastinate until the deadline is close at hand, or even past. They then expect the society to somehow get the papers into the hands of the meeting participants well before the meeting takes place. Should this be impossible, the author is likely to hold the society, not himself, at fault. When the situation is changed, and the author's actions alone determine whether the paper will go out on time, he has a clearer perception of the importance of acting promptly, and has nobody else to blame if things go wrong. Persons attending the meeting benefit from this, since they have more time to read, analyze, and evaluate the papers. One organization that has adopted this plan has found that papers no longer need to be formally presented at their meetings, since everyone has had ample opportunity to read them beforehand.

Problems and Limitations

The most obvious limitation to this plan is that it is appropriate only for relatively small meetings (100 attendees or under). With larger numbers of people, the cost to the author of reproducing and mailing his paper would climb so high that he would probably have difficulty in persuading his parent institution to reimburse his expenses. Even with the proviso that this be limited to small meetings, some authors may find that it presents them with financial difficulties. In such a case, the society may have to assist the author, particularly if the paper is an invited one.

Since this plan places a burden on the author, and relies on his conscientiousness, the society must scrupulously do its part. In particular, it must insure early delivery of mailing labels to the author so that he will have no difficulty distributing his paper to attendees before the meeting takes place.

Applicability

As mentioned, the size of the mailing list is a major determinant of the applicability of this plan. The size of what might be considered a tolerable mailing list may be qualified by the average length of the papers that would be delivered. If the papers to be given are short, or if readers customarily receive only a summary before the meeting, this scheme might be applied to fairly large meetings, since the number of page impressions per paper would be small.

Management Considerations

The decision to adopt this approach to the dissemination of papers for meetings would usually rest with the society's executive officer or the individual coordinating meeting activities. That person should consider the scheme's feasibility in terms of possible savings to the society, more attractive scheduling, and the financial burden that the scheme would impose on the average author. Should the plan appear workable, it should be announced with the Call for Papers, preferably with some explanation of what it is likely to mean to the individual author (number of persons expected to be on the mailing list, approximate costs of duplicating a paper of a certain length in such a quantity, and so forth).

As soon as the mailing list is complete, the society will have it converted into mailing labels, in as many copies as are needed for the various authors. This can be done in several ways. If the list is very short, an office typewriter may be used. If the list is longer, a word-processing device (such as the IBM MC/ST) will be more efficient, since the names and addresses need be typed only once; the machine will automatically play them out onto the labels, and the names and addresses would be stored on magnetic [illegible] or tape, available for re-use. A third alternative would be to use a computer; the principle would be the same as that employed with the word-processor. Many data-processing service bureaus do a great deal of this kind of work, and for a nominal charge will store the mailing list for future use. The most convenient medium to use for the labels themselves would be pressure-sensitive labels; these come on waxed-paper backing, and the authors could easily detach them and apply them to envelopes of their choosing. If the lists were prepared in-house, the society would need someone to type and proofread names and addresses. The labels may be purchased from an office-supply store, or from suppliers of special office equipment and supplies. Otherwise, no special personnel or equipment would be needed.

Subsection I.7.
MARKETING

COOPERATIVE PROMOTION

Description

Scientific information, its producers, and its users do not exist within neat, exclusive boundaries. Growing specialization and cross-disciplinary interests go hand in hand. Information published in one area may be important to many persons outside the community that the publisher considers his primary audience. This has long been recognized by persons and organizations responsible for the secondary (i.e., bibliographic) dissemination of scientific information, but has often been overlooked, denied, or only casually acknowledged by persons with similar responsibilities for primary dissemination.

Scientific publishers often act as if they did not need to promote awareness of their publications. They have assumed–or acted as if they assumed–that everyone interested in their publications was known to them, and knew of them. They have often had the attitude that "marketing" was something crass, engaged in only by profit-minded commercial interests. Both of these attitudes have been particularly prevalent among scientific societies. Both are demonstrably wrong. Because of the fragmentation of science, and the extensive overlapping of its interests, the publisher who is willing to actively market his journals can almost always succeed in finding new readers. Cooperative promotion offers an attractive approach to developing new markets, since it deals in relatively well-defined communities of predictable interests.

Cooperative promotion may take any number of forms: sharing or exchanging mailing lists, reciprocal free advertising in journals, joint promotional campaigns, and many more. In some cases, an exchange of funds may be necessary; often, it is not.

Benefits

Cooperative promotion can bring a number of benefits. It can be a simple, relatively inexpensive, effective way of enlarging a publisher's audience, at least for certain items. Thus, it can increase revenues, offsetting the cost of publishing. (The reader should remember that scientific publishing is, almost by definition, short-run publishing; anything that can be done to move into longer press-runs will almost certainly improve the publisher's economic outlook.)

Cooperative promotion can yield secondary benefits, as well. It can help to establish, develop, and cement relations with other organizations with cognate interests. Such relationships can only benefit each organization, and its constituents.

Problems and Limitations

Inter-societal cooperation is notoriously difficult to achieve. The reasons for this are much more social than substantive, and consequently lie outside the scope of this Guide. Organizational inertia and defensiveness are two major barriers; unfortunately, there is no simple formula for overcoming them. One necessary element, however, is a clear indication of the potential advantages for all prospective participants.

Applicability

Cooperative promotion may be appropriate for practically any kind of information product or service. The cooperation is easiest to achieve, and the results are likely to be most effective, if the cooperating organizations have related, but not identical, interests. If the areas of interest are too similar, there is a strong likelihood of high overlap between the audiences, so that for each organization to promote to the other's constituency will not result in exposure to many new users. At the same time, close similarity of interests may mean that the organizations must compete for the same audience, unless they produce different kinds of information products.

Management Considerations

An important prerequisite for cooperative promotion is the knowledge, on the part of each publications manager involved, of what his cost-centers are and how they perform. This is because most cooperative activities will involve some sort of *quid pro quo;* to arrange these equitably and to everyone's satisfaction, some valuation of what each organization contributes must be made. This means that each organization must be able to place a value on its own contribution, and on that of the prospective partner. For example, suppose that two societies are considering the possibility of exchanging advertising space in their journals. Each must know what it costs to publish an advertisement of the proposed type and size. Each will, of course, know the circulation of its own journal. Each will also need to know the circulation of the other society's journal, to know how even the exchange is likely to be. If one of the journals has only a few hundred subscribers, and the other has several thousand, the exchange would favor the smaller journal. (This is not to say that the larger journal might not wish to make the exchange; if it did, however, it would almost certainly be for other considerations.)

REPRODUCE TABLES OF CONTENTS OF COGNATE JOURNALS

Description

An easy, relatively inexpensive way of broadening readers' awareness of current literature that may interest them is for each of several journals to print in each issue the others' current tables of contents. Readers who find articles of interest through this mechanism could then locate a copy of the source journal, or order a reprint from the original publisher.

Benefits

This practice can function as both a reader service and a marketing effort for the cooperating publishers. Readers' reactions should be positive, since they would have an easy way of keeping up with several journals at once. The publishers might find it appealing, too, since it could increase the demand for reprints.

Applicability

This system is most appropriate for journals that have some overlap or similarity in content, but relatively few common subscribers. If the same subscriber base were involved, there would be little reason for instituting the service, and little for the publishers to gain in increased demand for separates.

We also assume that a limited number of pages would be involved, so that the production-costs of each participating journal would not be greatly increased. This assumes that the number of journals participating in this scheme would be limited, and that no single table of contents would run more than two pages.

Management Considerations

The editor or publications manager who is considering this idea will want to look into the overlap between contents and readership of the journals involved, for the reasons we have already mentioned. He may also wish to set up a mechanism for monitoring the results of the exchange, to help in deciding whether to continue, expand, or drop the practice. This might be facilitated by binding an order-card into each journal, for readers to use in ordering separates from the other journals. Such a mechanism would be useful to the publisher, and would help the readers as well.

Aside from the user-service aspect of this idea, its premise is that each cooperating publisher has established a price for reprints that makes it desirable for him to sell as many as possible–in other words, that he approaches the distribution of separates as a revenue-generating activity (SEE: I. 11.4 –Promote Separates). If this is so, the increase in manufacturing costs caused by including the tables of contents of other journals should (if the other journals are well selected) be covered by the increased demand for separates.

The editors of the participating journals could consider one measure to minimize the cost of implementing this idea. Presumably, they would send each other camera-ready copy of the tables of contents of their respective journals. To minimize the space that these consume, each journal might photo-reduce this copy to about fifty percent of its original size before printing. The resulting copy would still be readable without magnification, but would permit the presentation of more journals, or of journals with longer tables of contents, than would be economical if the added material were carried full-size.

Each journal should carry an editorial announcement to alert readers to the new service.

Source of Additional Data

"Evaluation of the *ACS Single Article Announcement Service*," by Seldon W. Terrant and William H. Weisgerber; *Journal of Chemical Documentation*, Vol. 14(1), 1974.

PROMOTION OF SEPARATES VIA CURRENT-AWARENESS CATALOG

Description

One way to promote awareness of the contents of several journals that deal with the same topic, or related topics, is to bind all of their tables of contents into a single catalog. The publisher(s) would distribute this catalog as a publication in itself; readers would use it to identify articles that they wish to see, and order them as separates. Many readers will recognize this as similar to the idea behind the Institute for Scientific Information's *Current Contents.* The difference is that *Current Contents* is designed to serve as a basic current-awareness tool, covering thousands of journals. The application of the concept that we are describing, on the other hand, is much more limited. It would involve a relatively small number of journals (not more than two or three dozen), and an even smaller number of publishers.

The resulting publication would be a flier, or slender catalog, that a reader could browse through in less than an hour. It would contain price and ordering information, and might have a tear-out order-card bound into the document. The catalog would have a simple, specially-designed cover. It could be produced by assembling the plates used to print the tables of contents for all of the participating journals, and running them to produce a separate publication. This catalog would be sold by subscription, priced to recover costs. Readers would be directed to order separates from the publishers, not the authors. These separates would be sold at their normal prices, which would be calculated at several times the cost of manufacture.

This concept is very similar to one we describe in another entry (II.3–Selective Dissemination of Individual Articles) as one of the basic approaches to selective dissemination of documents. The difference is important. The system we describe in the entry on Selective Dissemination is one that would operate *in place of* normal journal publication. The one we are describing here would be an *adjunct* to a conventional journal. It presupposes that articles would be composed in some way (albeit, perhaps, by the author), and that plates would be made for manufacture of a journal. The price charged for a separate under this system, although much higher than the price to the subscriber of an article in the journal, is still much lower than that which the publisher would have to charge if separates were the only mode of distribution. If separates *were* the sole mode of distribution, the unit cost of manufacturing them would be much higher than under the system we describe here.

Benefits

This system could benefit publisher, author, and reader. The publisher's principal motive for implementing it would lie in its potential for generating income. At the same time, it should appeal to both readers and authors, since readers would be provided an inexpensive mechanism for keeping up with a number of journals, and authors would have their work exposed to a larger audience than would read any single journal.

Applicability

As we said earlier, this idea is best applied to a relatively small group of journals, produced by a few publishers. The simplest application would be by a scientific society (or other publisher) that produced a number of journals. The society could easily prepare the catalog, and announce its availability in each of its journals. Applications involving several publishers would be somewhat more complicated, particularly if they used different printers. In such a situation, the reader's task would be more complicated, too, because of the necessity of sending orders to several sources. All in all, there would probably be serious production problems in implementing the idea with more than three or four publishers.

The size of the catalog is also important, both for cost-control and from the reader's viewpoint. The catalog is not intended as a major bibliographic tool, but as a convenient means of access to selected items in the current literature. It should be small enough to permit readers to skim through it fairly rapidly. If its size were to get out of hand, readers would not consult it, and its purpose would be defeated. The contents of 10 to 20 journals seem to us the ideal range for proper catalog size.

Management Considerations

As we have said, the simplest application of this idea would be to a single publisher, such as a society, that produces a number of journals. We assume some subject overlap among the various journals, although this need not be high. The major advantage of this situation would lie in the ease of production, and in the simplicity for the reader of ordering all documents from a single source.

Production would be simplest if all journals were of the same physical size. In such a case, no recomposition would be needed to produce the catalog. In any event, the production of the catalog should be performed as inexpensively as possible. Appearance is of little interest, since the catalog would have almost no archival value. Graphic and editorial quality would be the province of the source journals; the catalog should be something that the reader could use and throw away.

The catalog should be sold on subscription, but priced as modestly as possible. The publisher(s) should establish a price that would cover the cost of production and distribution, but strive for a price low enough to maximize the catalog's appeal. The price for separates will, of course, be much higher. As we have said elsewhere, any attempt to develop separates as a source of revenue requires that the publisher price them at a level which will more than cover the cost of manufacture, storage, order-fulfillment, and distribution. In addition, the publisher's mechanisms for order-fulfillment should be capable of rapidly processing a substantial number of orders.

The catalog itself should be promoted as heavily as possible. Editorial announcements and advertisements should appear in each of the participating journals. Promotional leaflets could be distributed at meetings. A separate announcement could be included with each subscription-renewal form sent to subscribers to the participating journals. If the publisher is a membership society, the catalog should be described in the membership kit, and made a regular subscription option.

PRE-PUBLICATION ALERTING SERVICE: ABSTRACTS PUBLISHED IN PRIMARY JOURNAL

Description

In most journal publishing, there is a substantial delay between a manuscript's acceptance and its appearance in print. During this time, the paper is in a kind of limbo: it is, or will be, part of the professional literature, yet it is not "visible" to readers. A number of journals have tried to remedy this by attacking various aspects of the problem. Some have concentrated on reducing the delay between acceptance and publication of a manuscript (SEE: I.2.2–Limit or Eliminate Copy-Editing of Journal Articles, and I.2.3–One-Step Proof-Corrections).

Another approach is to make readers aware of papers before they are published. One way of doing this is to publish bibliographic citations and abstracts of forthcoming articles in a special section of each journal issue. If the schedule for publication of the various papers is known, the expected date of publication could also be included with the abstract.

Benefits

Readers and authors could both benefit from this type of pre-publication alerting service. Readers could skim the announcements to identify upcoming articles likely to interest them. They could order separates in advance of actual publication, and be assured of receiving them with minimal delay. Should they prefer, they could contact the author and request a pre-print.

The author would also benefit. One of the major motives for scientific publishing is to establish contact with persons who have similar interests or are engaged in related work. Pre-publication abstracts make this kind of contact possible without the interested parties' (author and reader) having to wait until the author's paper actually appears in print.

Applicability

This idea should be worth considering for any journal whose papers have to wait more than two months before publication.

Management Considerations

Implementation of this idea would require only a modest departure from normal operation. It would add slightly to the page budget required for the journal, since it would mean the creation of a new section. It would also require that the abstracts of accepted papers be edited earlier than they would normally be, so that they could be included in the new section.

It would probably also mean that the journal would receive orders for reprints considerably earlier than usual. The business manager will want to create a system for accumulating and filling these orders. (N.B.: this early receipt of reprint orders may actually be an advantage, in some cases, since it may help the editor to decide how many offprints of each article to order for sale as separates.

PROMOTION USING OTHER ORGANIZATIONS' MAILING LISTS

Description

To the extent that they actively promote their publications at all, most scientific publishers limit their promotional activities to their current audiences. In the case of a journal publisher, this means promoting mostly to persons who already subscribe to the journal. If the publisher is a society, promotional efforts may be directed to all members of the society (rather than just to the ones who subscribe to a particular journal), but they rarely extend beyond this.

Experienced editors and publishers say that this approach needlessly limits the size of the publisher's audience, leaving the expansion of that audience to chance. They say that one way for the publisher to effectively reach a larger audience is by renting or buying mailing lists from other publishers, journals, and societies, and from commercial mailing-list vendors. The publisher should use these lists for direct-mail promotional campaigns to market journals, books, monographs, manuals, and special publications.

Moreover, they say that the publisher should not be content to do this once. Rather, he should rent or purchase the lists repeatedly, and use them as a regular part of his promotional activity. They recommend renting or buying such mailing lists, rather than trying to create and maintain them in-house, because of the impossibility of keeping them up-to-date.

Benefits

Experienced editors say that almost anyone who uses this marketing approach will be able to reach new readers. This can result in new journal subscribers, increased sales of special publications, and, in the case of a membership society, new members. It should also, of course, result in increased income for the publisher.

Problems and Limitations

The publisher should be careful to select mailing lists that are appropriate for his publications. He can do this by approaching societies in cognate disciplines, publishers of journals in fields related to his own, and commercial suppliers of mailing lists that include populations likely to want his publications.

Of course, the rental and purchase of mailing lists cost money, and direct-mail advertising can be expensive (although it is widely considered the most effective form of advertising). Therefore, the publisher must be sure that the size of the mailing lists that he procures is consistent with his advertising budget.

Management Considerations

The manager may find it desirable to obtain and use one mailing list at a time, starting with one whose members he is sure will have some interest in his publications, and gradually moving on to others. If he uses them singly, he can measure the impact of each individual mailing.

Alternatively, he can encode the material that he mails so that he will be able to determine which mailing list prompted each order he receives. This will enable him to determine empirically which mailing lists are most effective for him, so that he can be sure to use them repeatedly. If he finds that certain mailing lists result in very limited response, he can drop them from future promotional campaigns.

PERIODIC PROMOTION TO JOURNAL SUBSCRIBERS

Description

The journal publisher can readily promote reprints, back issues of his journals, and other publications by periodically sending promotional announcements to all of his current subscribers. He can design a flier and order form, and send them to all current subscribers in a special mailing. Alternatively, he could insert a flier in an issue of the journal. In this case, he could have a tear-out "bingo" card bound into the journal. Readers would simply circle the numbers identifying publications they wish to order, and mail the card to the publisher.

Benefits

A significant part of the income of many journal publishers comes from the sale of reprints, back issues, and special publications. Periodic announcements to current subscribers are a good way of keeping journal readers aware of these other publications.

Problems and Limitations

This type of promotion will be most effective if it is used with some discretion. If the publisher uses this type of promotion too often, readers may become used to it and ignore it. The publisher should therefore time the announcements carefully, so that they retain their impact.

Applicability

This type of promotional activity should be useful for any journal publisher who produces other publications, or who takes direct responsibility for selling reprints and back issues of his journals.

Management Considerations

If the publisher has a great many publications to advertise in this way, he might find it better to limit each announcement to a few publications, so that each publication will be noticed. He may also find it worthwhile to try to time the announcements of particular items to coincide with important meetings, important developments in certain areas, and other events that may enhance the appeal of items he wishes to promote.

HOUSE ADS IN WHITE SPACE

Description

Every journal issue contains a certain amount of "white space." Editors generally agree that it is desirable to minimize this unused space, because it adds to the cost of paper for printing the journal. As a result, many editors design their journals so as to leave as little space as possible between articles. This reduces the amount of white space, but results in a format that is inconvenient for the scheduling of page make-up (in this format, all material must be on hand before pages can be made up).

An alternative design is to make each article a separate module, beginning on a new page (SEE: I.3.3–Begin Each Article on a New Page). This format facilitates journal make-up, and is generally preferable for the production of reprints, but it does result in more white space than there is in continuous make-up. This white space can be partially filled with house advertisements, meeting announcements, and other messages that the publisher needs to convey but does not need to locate in a particular place in the journal.

Benefits

This practice makes good use of space in the journal, while still permitting the publisher to use a design that is desirable for journal make-up and reprints.

Management Considerations

The manager may wish to develop a series of "standing" house ads, to be used in white space wherever and whenever possible. These could promote sales of back issues of the journal, reprints, and other documents. The space could also be used for more specialized announcements, such as meeting announcements and calls for papers.

COMPUTERIZED ANALYSIS OF INFORMATION TRANSACTIONS

Description

We will summarize here one use of a flexible computerized file-maintenance system that has been designed to serve the needs of scientific societies–especially smaller ones. The part of the system that concerns us creates and maintains a series of records, each of which is made up of a number of sub-records, or "fields." Each record represents a person (a journal subscriber or society member). Each person's record contains a number of items of information concerning him, such as educational background, area of specialization, professional affiliation, work setting, and address. In addition, it records all significant transactions between the person and the central office (the publisher or society). Thus, for instance, when a person subscribes to a journal, that is added to the other information about him. When a promotional mailing is made, each recipient has this indicated in his record. If a person responds to such a mailing, this, too, goes into his record. The result is a very complete profile of each individual, in terms of background, demographic characteristics, and areas of interest in information products and services.

The file can be sorted according to each of these elements of information, so the society or publisher can select a very precisely defined subset of the total file. For example, the publisher might want to identify all persons with Ph.D.'s in a certain part of the country, who are working in research environments, interested in a certain field, who subscribe (or do *not* subscribe) to certain journals. The computer system could automatically select from the file the names and addresses of people with these characteristics, and prepare mailing labels for them.

Benefits

Use of this type of system could make a publisher's promotional efforts much more efficient than they would otherwise be, because it would permit him to direct his message to the persons most likely to be interested in it.

Problems and Limitations

Although promotion based on this system is likely to be quite *efficient*, it will not necessarily be most *effective*. In fact, use of this system is based on a notion exactly the reverse of the one generally employed in marketing. Where the usual approach is to cast one's net as widely as possible, this approach tries to limit the promotion to persons who are almost certain to respond. It would therefore be dangerous for the publisher to rely exclusively on this system to select audiences for his promotional efforts.

Applicability

From the preceding section, the reader should have inferred that this type of system is best used for marketing items that are likely to appeal to narrow audiences. In such cases, mass mailings are likely to reach only a few more interested persons than the selective approach, so the economy of the latter is desirable. It is also useful when the total population is very heterogeneous, if the publisher can predict the characteristics of the persons who are likely to be interested in any given product.

Management Considerations

The manager who is interested in this type of system (which, by the way, can be used for purposes other than marketing, such as membership functions and subscription-fulfillment) should investigate the possibility of using off-the-shelf software, since packages for this purpose have already been developed. As we said earlier, the software that has been developed for this type of application was designed especially to suit the needs of small societies.

Source of Additional Data

The system that this description is based on was developed with the financial support of the National Science Foundation. It is called SIPPS (*S*ystem of *I*nformation *P*rocessing for *P*rofessional *S*ocieties). For further information contact Capital Systems Group.

Subsection I.8.
MARKET RESEARCH

USER PANEL FOR MARKET ANALYSIS AND FORECASTING

Description

For years, commercial market researchers and public-opinion pollsters have used statistical sampling techniques to select small populations to accurately represent larger markets or audiences. This technique has become an accepted part of product or service development for most large corporations: any proposed new product or service is tested by a small group of persons selected to represent the producer's potential market.

To date, this same technique has not been applied, so far as we know, to the development of information products and services. One large society, however, is currently in the process of implementing this idea. It has selected a small group of members, carefully chosen to accurately reflect the characteristics of the entire membership. As new information products and services are developed, each will be reviewed by this user panel, to see whether it is responsive to user needs, and worth full-scale implementation.

Benefits

Successful application of this market-research tool should result in the development of products and services that genuinely meet users' needs and reflect their interests, and have a good chance of becoming financially viable. The purpose of the idea is to permit the sponsor to experiment with new products and services, but in a relatively "low-risk" environment. To the extent that the sponsor is successful, this should make him both responsive to user needs and more secure financially.

Problems and Limitations

The success of this type of market research depends very heavily on the quality of the sampling technique. The reliability of sampling techniques increases with the size of the population to be studied and the sample size. To apply the idea requires that one have a good profile of the "parent" group. Otherwise, it is very difficult to tell whether the selected sample is actually representative.

The selection of a sample requires considerable sophistication in the statistical techniques of social-science research. This expertise must be combined with a knowledge of the important features of the community to be studied and the characteristics to be represented in the sample.

The publisher must be prepared to balance the results of any study done with a representative user panel against other considerations; it would be unwise to rely entirely on the user panel. In this respect, the situation of the scientific society or publisher differs rather sharply from that of the commercial manufacturer or service organization. The scientific publisher must consider that some things are worth doing even though they may not be extremely popular or lucrative. (This, in fact, is at the heart of scientific publishing: it is done to meet a responsibility and fill a need, not to make money.) In addition, some products and services may have a potential for success that cannot be seen from short-term testing with a user panel. Some services, by their nature, require acclimatization on the part of the users. Moreover, services that at one time meet with little or no enthusiasm may later seem much more in tune with readers' needs and interest.

The publisher who establishes a user panel must realize that it will experience a certain amount of turnover in membership. He must be prepared to add new members to the panel as old members leave, and make sure that the panel continues to represent accurately the important characteristics of the entire user population.

Applicability

As we have mentioned, the publisher who wishes to use this idea must be able to verify the sample's representativeness. This requires that information concerning the important characteristics of the total user community be known, or at least available. The most logical applications of the concept would therefore be to a membership organization, such as a scientific or engineering society. We have also mentioned that the reliability of the technique improves according to the size of the community being represented. This suggests that the technique could best be applied to fairly large societies.

Management Considerations

The manager who wishes to apply this technique would be well advised to obtain the services of someone experienced in its use, particularly in marketing applications.

CITATION INDEXING TO ANALYZE DEMAND FOR JOURNALS

Description

Citation indexing is a system for showing relationships between published items. A citation index consists of a list of references (journal articles, monographs, or books). After each reference, there appears a list of all of the published works that, within a stated period, have cited the referenced item. Thus, each entry consists of a cited work (the reference) and one or more citing works (the ones that refer to it). Figure 1 shows a sample entry from a citation index.

Figure 1

CITED AUTHOR	CITING AUTHOR	CITED YEAR	PUBLICATION	CITING YEAR	VOLUME	PAGE
Jones, James	———	1972	J. Phys. Chem.	———	123	469
	Smith, J.		J. Chem. Phys.	1974	139	1984
	Doe, J.		J. An. Chem.	1974	98	203

Citation indexing can be used for many different purposes. We will describe one possible application in an area in which few reliable tools have been developed—market research for scientific and technical journals.

This application uses citation indexing to demonstrate relationships between journals, rather than between individual articles. It assumes that the articles which appear in a journal reflect the interests of the journal's readers.

If one were to take every issue of some particular journal for a certain period—say, one year—and go through the bibliography appended to each article that had appeared in it, one could prepare a list of every publication that had been cited in the source journal and the frequency with which each publication had been cited. Because most, if not all, of the publications cited in the journal would be other journals, the list would be weighted with journals most likely to interest the readers of the source journal (the weighting would be supplied by the frequency of citation).

If one collected complete sets of each of these other journals for the same period and counted the number of times the source journal was cited in each of them, the result would be a fair indication of the probable level of interest that readers of each of these other journals would have in the source journal. Those journals that cited the source journal very frequently might be considered to represent high-demand groups of readers, or potential markets for the source journal.

The editor of the source journal could use this information in several ways. He might wish to advertise his journal in the high-demand journals; he might wish to rent or buy the mailing lists for these journals; or he might wish to propose joint promotional campaigns to the editors of these journals.

Benefits

Developing this kind of information would provide the editor or publications manager with a firm, empirical basis for marketing activities. He could approach new markets on the basis of a demonstrable overlap of interests between his readership and the readers of other journals.

Problems and Limitations

Practically speaking, implementation of this idea requires a computer. The operations involved are not complicated in themselves, but their number is almost certain to be so great as to preclude manual processing.

A more fundamental problem is that all of this data-processing and analysis may do no more than confirm the editor's intuition. If this happens, a good deal of time and money may have been spent merely to corroborate the editor's good judgment and knowledge of his field; in some cases, this corroborative evidence may prove to be both useful and necessary as the editor attempts to justify his promotional campaign to a skeptical editorial board. The difficulty is that the outcome of the analysis cannot be foretold (sampling techniques could be used, but their reliability in a situation of this type would probably be low).

Applicability

The most logical candidates for this kind of market analysis would be journals with a good deal of cross-disciplinary appeal. Use of the citation-indexing technique would help the manager to target high-priority audiences for promotional activities. If the journal were narrowly focused, on the other hand, the editor would probably know more or less intuitively where to direct his promotional efforts.

Management Considerations

The editor or manager who is interested in applying this concept should first learn more about citation indexing, to make sure that he understands the concept and its possible uses. Thereafter, he should determine the approximate number of bibliographic citations appearing in his journal in a year. With this information, he should consult a data-processing specialist to get an idea of what the analysis would cost (special software packages have been developed for use in this application). He should understand that a great deal of the cost of the study will be in preparing input (probably on punched cards), rather than actual computer time. He should also understand that if he intends to make the analysis an ongoing operation, it can become quite expensive.

Sources of Additional Data

For a general explanation of citation indexing, the reader should consult the works of Eugene Garfield, President of the Institute for Scientific Information, who developed the *Science Citation Index*. The reader should particularly consider the following:

- "Citation Indexing: A Natural Science Literature Retrieval System for the Social Sciences," *The American Behavioral Scientist*, Vol. 10 June 1964.
- "Citation Analysis as a Tool in Journal Evaluation," *Science*, Vol. 178, November 1972.
- "What Scientific Journals Can Tell Us About Scientific Journals," *IEEE Transactions on Professional Communication*, Vol. PC-16(4), December 1973.

For discussions more directly pertinent to the application we have described here, the reader might wish to consult several papers by Paul W. Hamelman and Edward M. Mazze:

- "Citation Patterns in Finance Journals," *The Journal of Finance*, Vol. 29(4), September 1974.
- "How Business Journals Cite One Another," *Journal of Advertising Research*, Vol. 14(3), June 1974.
- "CASPER: A Program for Selecting Business Journals for Research Use," *Journal of Marketing Research*, Vol. 11, November 1974.
- "Cross-Referencing Between AMA Journals and Other Publications," *Journal of Marketing Research*, Vol. 10, May 1973.

Subsection I.9.

ORGANIZATION AND MANAGEMENT OF OPERATIONS

ELECTRONIC EDITORIAL PROCESSING CENTER

Description

The "Electronic Editorial Processing Center" refers to the integration into a total system of several concepts described individually in other entries of this Guide. The basic concept of the EEPC is that of a central processing facility which would act as a service bureau, to perform automatically all of the functions associated with primary publishing that lend themselves to processing by computers and other sophisticated modern equipment. The EEPC might serve a single large publisher; more probably, it would serve a number of publishers with common or compatible processing requirements. The EEPC could operate at any of several levels of complexity, size, sophistication, and capital cost; the model described here will be the one which, at present, seems the most advanced version that the state of the art would permit.

We should point out that, even when it is not a conscious design concept, the EEPC seems to be a natural result of the evolutionary changes currently taking place in large-scale publishing systems; newspapers and magazines, in particular, are using more and more of the technologies on which the EEPC is based, in configurations similar to the one we will now describe.

Authors would type their papers on typewriters equipped to produce input for optical character recognition (OCR) systems, in appropriate formats. They would send their manuscripts to the EEPC, where they would be "read" by optical scanners and automatically logged in by a computer. The computer would assign an accession number, commit the entire manuscript to magnetic storage, generate a printout of the paper for mailing to the editor, and produce an automatic acknowledgement to be mailed to the author. The manuscript itself would be discarded. The editor would read the printout of the paper, decide how it should be handled, and telephone the EEPC. A clerk would enter his instructions, through an on-line terminal, to the growing record created for the submitted paper. After verifying his instructions with the clerk, the editor would discard his printout.

The computer system would automatically carry out his instructions. If the editor decided to reject the manuscript, the computer would prepare a notice for the clerk to mail to the author, and purge the manuscript from its files. Should the editor decide to refer the manuscript to another journal, he would identify that journal, and the computer would generate a printout and covering note for forwarding. Should the editor wish to have the manuscript sent to referees, he would indicate the appropriate specialties by words selected from an approved list of terms, or by actual names, if he desired particular individuals. The EEPC would maintain, in computer-readable form, a roster of qualified referees, with indications of expertise and complete records of transactions with the EEPC (including current assignments, performance record, dates unavailable, etc.). Editors working through the EEPC would regularly receive printouts from this roster concerning referees in subject areas relevant to each editor's areas of interest.

Whether the editor selected the referee, or whether he instructed the computer system to make the selection, the system would automatically generate a package of materials for the referee. This would include a printout of the manuscript, an evaluation form, a standard list of instructions, and any special instructions the editor may have given for this particular manuscript. The computer would also enter, in the referee's record, the date of assignment and the accession number of the manuscript; should the referee not respond within a specified time, the computer would automatically send out a reminder notice.

(At intervals, the computer would generate a list of manuscripts that have been in reviewers' hands longer than they should be.) The referee would review the printout sent him by the EEPC, and would fill out the evaluation form with an OCR-compatible typewriter. He would return this to the EEPC, where it would be processed, and the referee's comments would automatically be added to the manuscript's file. When all referees for a particular manuscript had been heard from, the system would automatically print out all contents of that manuscript's file, and forward them to the author.

The editor would examine the new package, and decide the disposition of the manuscript (rejection, acceptance, referral to another journal, or further review). Should he wish to transmit the referees' comments to the author, he would mark selected portions of the printout, and mail this to the EEPC. There, these sections would be flagged in the manuscript's record, and any further comments made by the editor would be added. A clerk would then instruct the system to generate the package for the author. This package would consist of a printout of the manuscript, together with all comments the editor had selected for the author's scrutiny. This package would be mailed to the author.

The author would review these comments, and would mark the printout to indicate deletions and points at which new material should be inserted. He would type the new material on an OCR-compatible typewriter, in appropriate format. He would return the marked-up printout, together with the new material, to the EEPC. There, the new material would be converted into machine-readable form, and merged into the "manuscript" (still in magnetic storage) through an editing terminal. At the same time, the author's deletions and corrections would be made from the marked-up printout. When the manuscript in the file had been revised, a printout of the complete file would be sent to the editor.

The editor would review the revised paper, together with all of the referees' comments, and decide further disposition of the manuscript. He could, as before, reject it, refer it to another journal, or recycle, according to the procedure already described. Should he decide to accept it, he would telephone this instruction to the EEPC. The manuscript would the pass through stylistic editing and redacting. This would be done in the EEPC, by editorial specialists with the support of computer programs. First, the manuscript would be processed by a program to identify misspelled words and typographical errors. The words which might be misspelled would be displayed on a video display terminal (VDT); the editor would enter the correct spellings, and the system would automatically make the necessary changes. In similar fashion, the style and format of the article would be modified, where necessary, to conform to the journal's requirements. At the conclusion of this process, the system would print out the edited manuscript, which the clerk would send to the author for final approval. Should he wish to make changes, he could mark them on the printout and return it to the EEPC. Otherwise, he would telephone the EEPC and give his approval for publication.

His approval would be added to the manuscript's record and the system would automatically assign the article a tentative place in the journal's publication schedule.

Through periodic listings that the system could automatically prepare, the editor would have an opportunity to review the make-up of every issue and the schedule of every article's publication. He could alter this at will, through the means already described for giving instructions to the system. As each issue of the journal became ready for publication, the system would produce a magnetic tape to send to the printer for photocomposition. It could also produce tapes, containing either the full articles or their abstracts alone, to send to bibliographic processors or information analysis centers.

Benefits

The EEPC should have several advantages over traditional publishing processes. First, the operation of the EEPC should be more economical than that of a traditional publishing system. Each manuscript would be keyboarded only once—by the author; all modifications of the manuscript would be made selectively, and semi-automatically. Author's alterations, and other expensive changes and corrections, would be made *before* composition; the only requirement for making changes at the galley-proof or page-proof stage of processing would stem from machine error (which, in this type of processing, is very low). In the most advanced configuration of the EEPC, all routinizable tasks would be computerized, or at least computer-assisted. This would make them much easier and more economical. It would also minimize the burden on author, editor, and referee.

The EEPC should significantly reduce the time required for the entire publishing process, because each processing step after the original submission of the manuscript should take less time than in conventional systems. Moreover, management of the entire process should be enormously simplified, with many of the annoying problems that plague conventional systems (lost or mislaid manuscripts, slow reviewers, disorganized correspondence, etc.) virtually eliminated.

In addition, the EEPC would provide the nucleus of a much tighter, more sophisticated, altogether more satisfactory communication system. It would greatly simplify the linkage between primary journals and secondary processors of scientific literature, and would greatly facilitate the re-use of the information that its users process. Finally, it would provide a starting point from which to develop direct linkages between authors, editors, referees, and readers.

Problems and Limitations

The problems associated with implementation of the EEPC concept are of three kinds: technical, financial, and organizational or social. They interact with one another, but for ease of exposition we will sketch them separately here.

The technology required for all aspects of EEPC operation, as outlined above, already exists, and in operational form. To create an EEPC, however, requires that several kinds of technology—optical character recognition, text-editing systems, inventory systems, and computerized photocomposition—be brought together into one integrated system. There are two problems in this. First, considerable development may be required to provide the necessary in[illegible]es and communication capabilities. Second, not all of the technology involved has y[illegible]ome advanced enough, or diffused widely enough, to permit an EEPC to operate exc[illegible]ely in the most advanced or desirable mode. For example, OCR, while much more wi[illegible]read now than it was just a few years ago, has not become common enough to be practical as the main form of input from authors. Moreover, OCR and photocomposition cannot, in their present state of development, handle mathematics and other complicated material as flexibly, conveniently, or inexpensively as can traditional processing technologies.

The basic economic problem associated with the EEPC is that its developmental and start-up costs would be high (according to one analysis, they would range, as a function of the EEPC's level of sophistication, from a minimum of $335,000 to nearly $800,000). To obtain funding at this level could be very difficult, particularly since there is a strong likelihood that there might be additional, unforeseen, or hidden costs, due to the fact that establishment of an EEPC would involve breaking new ground.

The most substantial barriers to implementation of the EEPC concept may be social and organizational. To work best and most efficiently, the EEPC should operate on a large scale. In scientific publishing, this inevitably means that it should be used cooperatively, by a number of publishers. This, in turn, implies inter-organizational or inter-societal cooperation, which is notoriously difficult to achieve. Furthermore, the EEPC would require at least some measure of standardization among the organizations using it; this, too, is very difficult to achieve. Most problematic of all, development and operation of an EEPC would require a joint financial venture on the part of the publishers who would use it. Even if interest in the project were high, and the necessary funding available, this might be very difficult to arrange.

Applicability

In principle, the EEPC concept is applicable to any scientific publishing operation, regardless of size or frequency of publication. As we have mentioned, its attractiveness increases with the volume of processing to be performed; the corollary of this is that below a certain point, the scale of operations would not justify creation of an EEPC.

The EEPC should be quite attractive for small societies or publishers who could use it as they would a data-processing service bureau. To establish an EEPC around the requirements of small publishers, however, would require the involvement and cooperation of a number of these organizations. This, in turn, would exacerbate all three of the types of problems that we mentioned earlier. Consequently, it seems more practical to consider the EEPC–at least in terms of its initial establishment–as a facility to serve a small number of larger scientific publishers. In this case, the technical problems of standardization and compatibility would be minimized, the chances of obtaining the required financial support would be greatest, and the number of organizations required to cooperate in the venture would be small. Moreover, large publishers are much more likely than small ones to have had some experience with the technologies that the EEPC would depend on; thus, conversion to the EEPC would be less disruptive and jarring to them than it would be to users without such experience.

Management Considerations

Implementation of the EEPC concept would require very careful, thorough systems analysis, planning, and development; we cannot hope to cover it adequately in this brief summary.

We can make one general suggestion concerning implementation. The best way to develop an EEPC would be to design and implement "backwards," beginning with a computerized photocomposition system, and adding incrementally the other capabilities that we have described. This will ensure compatability throughout the system, and should result in some operating economies from the very outset of system implementation, since it is from computerized photocomposition that some of the greatest advantages of the EEPC would derive.

Sources of Additional Data

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"The Editorial Processing Center," by Harold E. Bamford, Jr., *IEEE Transactions on Professional Communication*, Vol. PC-16(3), September 1973.

NTIS: Editorial Processing Centers–A Study to Determine Economic and Technical Feasibility
Final Report (PB 234959)

Part I – A Baseline Study of Current Journal Practices in the Life Sciences (PB 234960)

Part II – A Review of Relevant Technology to the Publication of Scientific and Technical Journals (PB 234961)

Part III – The Design of Four System Configurations for Publishing Scientific and Technical Journals (PB 234962)

Part IV – Survey of Authors, Reviewers and Subscribers to Journals in the Life Sciences (PB 234963)

Part V – Economic Analysis of Journal Publishing in the Life Sciences (PB 234964)

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"ANPAT–A Computer Editorial Program Developed at Easton Research Center," by Erwin Jaffe; American Newspaper Publishers Association Research Institute *R. I. Bulletin* #974, October 10, 1968.

"Innovative Editorial Procedure: The Editorial Processing Center Concept," by Lawrence H. Berul and Beth I. Krevitt; *Proceedings of the 37th ASIS Annual Meeting*, Vol. 11, October 13-17, 1974.

COTTAGE-INDUSTRY APPROACH TO COMPOSITION

Description

From its original socio-economic meaning, the term "cottage industry" has come to be applied loosely to any work people can do in their own homes. Contemporary trends in management, which move away from tight, formal structure and centralization of operations toward greater flexibility and adaptibility, lend themselves to an integration of the cottage-industry concept into the functions of the ordinary business or editorial office.

Scholarly publishers have used free-lance editors for years. Application of the cottage-industry concept to composition, however, is more recent, and has paralleled the growing acceptance of strike-on composition. In fact, the two most convenient applications of the cottage-industry concept to composition are for strike-on (especially typewriter) composition, and the preparation of typescript copy that can be "read" by an OCR scanner for input to a computer-driven photocomposition system (SEE: I.1.3–OCR for Author-Prepared Scannable Copy). More unusual would be the application of this concept to "stand-alone" photocomposition (because few people working at home are likely to have the equipment), or preparation of input for computerized photocomposition (such as magnetic tape, floppy disc, or punched paper tape).

In this cottage-industry approach to the preparation of camera-ready copy or OCR input for photocomposition, the publisher would locate typists with the skills and equipment necessary to produce the needed output. He would train these typists, if necessary, and provide them with guidelines, blue-lined paper and typing elements (for typewriters that use interchangeable elements), and anything else they might need to perform their work (including typewriters, in some cases). The editorial office would assign copy to these typists, as appropriate, and monitor their work by telephone and face-to-face contact. Payment would be a matter of individual negotiation.

Benefits

This approach to composition should increase the publisher's processing capability without increasing his basic operating costs or adding to the size of the in-house staff. The publisher would pay the special typists only when they are actually working, and would pay no overhead on the work they provide. Thus, when recruiting such persons, he need not be concerned about whether there might be enough work to keep them busy full-time, nor about developing excess capacity. Because of this, the publisher should be able to respond quickly and easily to peak workloads and control his publishing backlog, without paying a premium price.

Applicability

The appropriateness of the cottage-industry approach to composition will depend on several factors. First, it must be compatible with the type of composition that the publisher uses, or wishes to use. (Of course, the capacity to "farm out" part of the composition might be attractive enough in itself to determine the publisher's selection of composition.)

Second, there must be a pool of qualified and interested typists, with the required equipment in their homes. Whether this is so will depend in large measure on the size and type of community in which the publisher operates. Ordinarily, the community must be of a certain size before such a system could be supported. We have found, however, that some academic presses have successfully applied this notion, even though they were located in small towns; the small "college town" is more likely to have the requisite talent pool than most other towns of similar size.

A third factor affecting the appropriateness of the cottage-industry system is the character and size of the publishing operation. Serious management problems might result if this were used as the basic mode of composition for a large operation. It would seem best suited to expanding the capacity of a relatively small-volume publisher with a need for flexibility within a limited budget.

Management Considerations

The publisher must carefully analyze his requirements for composition before he can tell whether the cottage-industry approach might be viable for his operation. He should informally investigate the labor pool in his area, to learn whether he might be able to recruit the desired personnel. He should then begin to produce guidelines for typists to use in preparing copy, and recruit the needed personnel. In all likelihood, he will have to consider recruitment a continuing activity. He should expect a certain amount of turnover; the best way to cope with it will be to have some qualified personnel always in reserve, since little or no cost will be associated with this.

Personnel recruited for this type of work should be carefully screened, since the requirements go considerably beyond those of ordinary typing. Some training or orientation may be needed, even beyond the publisher's guidelines, for those who are selected. The publisher should keep this as brief and simple as possible. One approach might be to give the applicant a manuscript that has already been proofread and composed. The new typist would have to interpret the proofreader's marks and produce smooth copy. The result could be compared with the manuscript as actually composed, to point out problems, misunderstandings, and questions.

If these special typists are using typewriters with interchangeable elements, the publisher may have to purchase some of these and furnish them to the typists, either for the production of OCR-scannable copy or for straight typewriter composition. This should not be a major expense, since these elements generally cost less than $30.00 each. If the typists are producing scannable copy for OCR, the publisher will have to explain the importance of proper adjustment of the typewriter, and should process some brief samples of work produced on each machine, to insure that the adjustment is satisfactory.

LARGE SOCIETY AS PUBLISHING SERVICE BUREAU FOR SMALLER SOCIETIES

Description

Most large scientific and engineering societies or federations have active publishing programs, producing journals, monographs, books, and special documents. To produce them, the large societies usually have sizable in-house editorial offices, supervised by professional managing editors, and staffed with qualified copy editors. Sometimes the society has in-house graphic artists and design specialists. In addition, the society that has this type of facility will have established the cost-accounting procedures and mechanisms necessary for the efficient management of a publishing operation.

In the small society that publishes, things are usually very different. Often there is no managing editor at all; the executive editor must try to oversee both the content and the business aspects of the society's publication(s). In most cases, he has no real qualifications for dealing with the latter; whatever he knows, he has learned through hard, sometimes expensive, experience.

It seems only logical that, at least in some cases, larger societies should function on behalf of the smaller ones as "publishing service bureaus." And, in fact, a number of large societies and federations do so. Their editorial and business-office personnel work on the smaller societies' journals, either by assigning certain persons to them full-time, or by prorating the time of personnel who deal with the publications of both societies. The larger society also prorates some of its facility costs to the smaller society. The managing editor of the large society handles all business arrangements needed for the small societies' journals (printing and distribution, reprint rights, and the like), either as part of his own society's contracts for these services, or as separate contracts.

The small society provides an executive editor, associate editors, and referees. These persons and the small society bear complete editorial responsibility for the journal.

Benefits

This type of arrangement permits small societies to publish that might not otherwise be able to afford to do so. For those that could produce a journal, it permits them to publish more economically than if they had to supply editorial facilities and to contract for printing services on their own. Application of the managing editor's expertise to the needs of the small society's journal is almost certain to result in better services at a lower cost than would be obtained if the small society had to fend for itself. Moreover, the small society's journal is likely to be published at a level of technical sophistication far beyond that which the society itself could attain.

Problems and Limitations

Most applications of this idea seem to work quite satisfactorily for all parties, but there are some potential problems, both in establishing the arrangement and in making it work. Small societies may be reluctant to seek the help of a larger one, either because they feel themselves to be in competition, or because they fear that they might lose control of a publication produced through the larger society. If the larger society takes the initiative and offers the service to the smaller one, its good intentions may be misinterpreted.

Once the arrangement is established, problems may arise if for some reason the smaller society is unable to bear its full share of the financial burden of publishing, particularly if the larger society finds it publishing program in financial difficulty.

Problems may arise, too, if differences of opinion develop over how the smaller society's journal should be produced. This is particularly possible if the large society experiments with new production techniques (such as photocomposition), or if readers of the small society's journal become unhappy about the way it is produced or distributed.

Applicability

This type of arrangement is most likely to develop between large and small societies with shared disciplinary interests. In some ways, this may be appropriate (e.g., so that copy editors can work on both societies' publications); in other areas, such as printing, this may be irrelevant. It is nevertheless a fact of life that it would be difficult to persuade a publisher specializing in physics to make his facility and services available to a society wishing to publish a journal in sociology.

Management Considerations

The most important consideration in establishing an arrangement of this sort is that the large society have an effective and sufficiently detailed system for accounting for the costs of the facilities and services it provides to the smaller society. Each journal should be treated as a separate cost center. Record-keeping must be detailed enough to permit accurate distribution of shared costs.

The managing editor of the large society must make sure that the executive editor of the small society's journal (and its executive officer) understands clearly what services are being provided and their basis. The arrangement should be periodically reviewed, to insure that it works properly and that both parties are satisfied.

JOINT PUBLISHING

Description

Joint publishing is exactly what its name suggests. Two or more organizations (societies, academic institutions, or other organizations) band together to produce a single publication, or series of publications. The publication might be a journal, a monograph or monograph series, a book, a manual, or some other special publication.

The division of labor and responsibility can vary. Each of the participants might be responsible for providing a portion of the contents of the publication. Responsibility for copy editing (if any) and composition could be divided, assumed by one participant on behalf of all, or secured by contract. The publication would have a design that all participants approve, and all contributions would be compatible with this. Printing and distribution would be performed under contract, as in the case of a normal publication. Reprint rights could be shared.

Benefits

Joint publishing could be an attractive means of disseminating material with cross-disciplinary appeal. In such a case, each of the participating publishers would presumably represent one of the disciplines in which the publication would be useful. Each publisher would thus represent an area of special competence, and could thus make a unique contribution to the quality of the publication.

Joint publishing might also be attractive if the cooperating publishers were too small for any of them to be able to bear the expenses of publishing, or to produce enough material to publish alone.

Whatever the circumstances of the participating publishers, joint publishing would provide a ready-made mechanism for joint promotion and marketing. The joint publication would automatically be exposed to a larger, broader audience than that represented by any one of the participating publishers.

Problems and Limitations

Joint publishing can suffer problems in coordination, scheduling, and resource allocation. Coordination will be easiest if one of the participants is assigned managerial responsibility for the entire operation, but it may be difficult to make this assignment, for social reasons. Generally speaking, the gravity of this type of problem will depend on the number of participants involved.

Applicability

As we have already suggested, joint publishing may be an attractive way of publishing on cross-disciplinary subjects, or for pooling the resources of several small publishers. Even in the latter case, cooperation will probably be easier to achieve if the participating publishers represent slightly different fields, with some areas of common interest.

Management Considerations

To the extent that a joint publishing program uses non-donated services or facilities (i.e., some processing is done in the central office of any of the participants), it will call for good cost-accounting, and the participants will have to agree on a formula for apportioning costs. In addition, some mechanism will have to be worked out for the individual participants' contribution to costs incurred jointly (such as printing and distribution), and for sharing income from sale of the publication and reprints.

Promotional activities will be most effective if they are planned jointly, or at least coordinated among the participants.

Subsection I.10.

COST-CONTROL, PRICING, AND FINANCING

COMPUTER SYSTEMS FOR ESTIMATING PRINTING COSTS

Description

Computer-assisted estimating is a recent development in the printing industry; only within the last year has it begun to be used on a significant scale. Several different systems are available, and their capabilities vary widely. Most of them, however, use minicomputer systems designed specifically for the planning and estimating of printing jobs. They can provide extremely detailed estimates of the costs of a given job, based on the customer's specifications and the printer's equipment.

Benefits

These systems permit the printers who use them to provide more accurate estimations of cost than were previously possible. The estimates are much more detailed, too, than was possible with manual processing. With computerized estimating systems, it is possible to take into account even such details as paper-grain direction and drying time.

These systems also make it possible to project alternative production plans, and instantaneously estimate their costs. This makes it much easier to optimize the specifications of a printing job.

Applicability

Computer-assisted estimating systems are designed for the printer, not the publisher. They do *not* take into account elements of cost other than those associated directly with printing and binding. The printer who has one, however, should be able to provide better service to his publisher client, and help the client to ensure that his publication is produced in the most economical way possible.

Sources of Additional Data

"Now . . . Computerized Estimating," by Donald H. Goldman; *Printing Reproduction*, January 1969.

The Graphic Communications Computer Association Section of Printing Industries of America offers seminars and workshops on this topic from time to time. For further information contact Capital Systems Group.

SPECIAL USES OF PAGE CHARGES

Description

Page charges were first introduced in the 1930's. Ever since then, they have been a controversial, though effective, method of defraying some of the costs of scientific publishing. Page charges are levied on the notion that it is in the interest of the sponsor of a research project to have the project's results publicized to the scientific community. According to this theory, the sponsor (not the author) will pay page charges in order to have the author's work made known. Patently, of course, this is not always true; thus, page charges are usually voluntary, so as not to deny publication to a meritorious author whose sponsor will not or cannot pay for an article's publication.

Many journals go no further than asking that authors pay a certain page charge, if they can. Others have gone further, and try to use the page-charge concept in special ways. We shall briefly describe and discuss some of these special uses.

Some editors have avoided levying page charges on all of the pages in an article. Rather, they have tied the idea of page charges to that of a page-limit for journal articles (page limits are quite common, even in journals that do not have page charges). In these cases, page charges are assessed only on pages in excess of the number allotted to each article. These charges are obligatory, not voluntary, and are calculated to insure that they will *at least* cover the cost of publishing the additional pages. A few editors have found it necessary to use *both* this type of page charge and the more usual, comprehensive charge. In this case, the basic charge may be voluntary, but the one assessed on pages exceeding the author's basic allocation is compulsory.

Another special use of page charges involves giving preferential treatment to the authors who pay them, or who pay them promptly. Authors who pay page charges very promptly may have the charge discounted. Other forms of preferential treatment include speedier handling and publication, or higher-quality composition than is used for other papers in the journal.

Very similar to the preceding idea is the possibility of *not* having all-inclusive page charges, but offering special treatment to the papers of authors willing to pay for it. Once again, this special treatment usually takes the form of rapid publication or high-quality composition. For example, a journal that uses author-prepared copy may offer to typeset papers, for a fee based on the number of pages of composed copy. Authors who pay page charges may be given a certain number of "free" reprints, while others have to buy them, or receive a much smaller number.

The idea in all of these possibilities is that the author should have available certain costly options (speedy publication, typesetting of his paper, or as much room in the journal as he needs to present his message), but that he or his sponsor should pay for these options.

Benefits

The general advantage of the three practices we have described is that they permit the journal to offer the author special treatment of his manuscript, even though it is costly, without risking financial disaster for the journal. One of the basic dilemmas in scientific communication—and particularly in scientific publishing—is the question of how to apportion the costs of communicating scientific information. The basic notion behind page charges is that the author or his sponsor should bear a large part of this cost. The idea behind the special uses of page charges that we have just described goes one step further: if, in a scientific journal, some items are more expensive to publish than others, the producers of those particular items should bear the added cost, rather than having this distributed among all producers.

The assessment of heavy charges against pages that exceed the author's allotment has another advantage: it encourages brevity, without prohibiting longer articles.

Problems and Limitations

If authors who voluntarily pay page charges, or who pay mandatory page charges very promptly, are given special treatment, the editor or journal may be criticized for discriminating against the author who cannot afford to pay. This is unfortunate, but little can be done about it. If the journal's policy were to be scrupulously even-handed, there would be no page charges, or no preferential handling of the manuscripts of authors who can pay the charges. In the first case, the journal that had found page charges necessary might be unable to continue publishing. In the second case, there would be little incentive for authors to pay the charges, with the result that the journal would once more be in financial trouble. Thus, if a journal is to have page charges at all, it is in its interest to compensate authors in some way for the money they spend, even though the result seems unfair to the author who cannot afford to pay.

It may help somewhat to state the proposition somewhat differently, as in the third option that we described earlier: namely, to offer special handling at a fee commensurate with the increased cost to the publisher, rather than impose a comprehensive page charge. A difficulty may arise here if the special handling (e.g., composed copy) concerns services that were formerly offered free of charge. Nevertheless, disgruntlement may be minimized if charges are presented in this guise.

Another, more fundamental, objection to the general concept of page charges is that they stave off financial disaster in the short term, without doing anything to improve the basic economics of publishing. The result, according to this argument, is that the journal, to remain solvent, must continually raise its page charges. At a certain point, most authors become unwilling or unable to pay, and disaster strikes anyway. In the meantime, the journal management has been shielded from harsh reality, and has not been motivated to develop better ways of producing the journal. This argument undoubtedly has merit, but need not be taken entirely at face value in its more extreme form. Rather, it should be construed as an argument against relying exclusively on page charges to prevent financial problems.

Applicability

Page charges of any sort are generally considered when a journal is in financial trouble. The considerations that determine adoption or rejection of page charges are at least as much matters of organizational policy as they are technical, however; in this area we can offer little guidance.

Page charges on material in excess of the basic article page budget, however, seem to us a special case. This type of charge might be an attractive possibility even for journals that would not consider imposing a basic, comprehensive page charge. Use of this special charge would, on the one hand, encourage authors to stay within the number of pages allotted to them. At the same time, it would make available to them additional space, should they want or need it, but without burdening other authors or the journal with additional expense.

Management Considerations

To apply page charges of any sort, the managing editor must have a reasonably clear idea of what it actually costs to publish a page in his journal. Ideally, this figure should be broken down according to the various steps in publishing: editing, typesetting, make-ready, printing, and distribution. Such a cost breakdown may be surprisingly difficult to obtain. The printer can probably help in this, although he may allocate his costs in such a way that accurate analysis in the terms we suggest is difficult.

The managing editor, or the policy-making body, may decide that page charges need not cover all costs of publishing. In any event, the charge or charges should be established within the framework of an understanding of publishing costs, expressed in terms of cost-per-page. Moreover, these costs should be periodically re-calculated, so that the manager may know how the charges relate to actual costs per published page.

Sources of Additional Data

"Page Charges: Who Should Pay for Primary Journal Publication?" by Marjorie Scal; *Economics of Scientific Publications*, Council of Biology Editors, Washington, D.C., 1973.

"Financing a Multijournal System in the 1970's," by John K. Crum; *IEEE Transactions on Professional Communication*, Vol. PC-16(3), September 1973.

Subsection I.11.

CREATION OF BY-PRODUCTS

REPRINT BOOKS

Description

Reprint books are books whose contents consist primarily or exclusively of reprinted journal articles. The articles may come from a single journal, several journals produced by a single publisher, or journals produced by several publishers. The articles are selected for their pertinence to a theme that the publisher considers timely and of broad interest.

In its simplest form, a reprint book would consist of nothing more than a series of reprinted articles, arranged into some sort of logical sequence, and provided with an introduction and table of contents. In a more elaborate version, the articles might be annotated, their bibliographies expanded, additional text produced to provide transition from one article to the next, and indexes prepared. In any event, the articles would not be recomposed; off-prints of the original articles would be used as camera-ready copy for the book. (As a result, if the reprinted articles were drawn from several sources, there would almost inevitably be inconsistencies in the physical appearance of the reprint book's contents.)

Two examples of this form of dissemination are the collection entitled *Energy: Use, Conservation, and Supply*, published by the American Association for the Advancement of Science, and the *IEEE PRESS Selected Reprint Series*, published by the Institute of Electrical and Electronics Engineers, Inc.

Benefits

The most obvious appeal of reprint books lies in their potential for generating income for the sponsor. Since the cost of composition would be limited to the preparation of supplementary materials (table of contents, introduction, index, etc.), the cost of producing the book should be relatively modest. Therefore, pricing the book so as to more than recover costs should not be difficult.

Reprint books' revenue-generating appeal, however, is merely one aspect of the fact that they re-use information that has already been processed. For most publishers (and users) of scientific information, this re-use should be attractive in itself. There has been considerable discussion in recent years concerning possibilities for making maximum use of individual scientific communications and items of literature; the reprint book would offer one relatively inexpensive way of increasing the rate of usage of at least part of the literature.

Another benefit, still closely related to the preceding one, lies in the visibility and exposure that reprint books provide for both publisher and author. By their nature, reprint books are used to appeal to relatively broad audiences, which normally consist of more persons than subscribe to the journal or journals from which the reprints are drawn. Thus, the book serves to acquaint some individuals with the sponsor and authors, and may have some beneficial impact on society membership or subscription to the journals from which the reprints are drawn.

Problems and Limitations

The prospective publisher may have some difficulty in selecting a topic for a reprint book. For the book to be successful, it must have both a substantial audience and a substantial, reasonably recent, literature to draw on. Optimizing the match between the audience and the literature will probably require intimate familiarity with both, awareness of current fashions in the discipline under consideration, and a certain sensitivity to publishing opportunities.

A second problem lies in the selection of articles to be included in the reprint book. This may require an extensive bibliographic search, similar to that which would be performed for a state-of-the-art review. Should the articles to be included in the reprint book come from many disparate sources, practical problems might arise in obtaining permission to reprint some of them.

Applicability

As mentioned in the preceding section, a successful reprint book requires both a sizable audience and a sizable literature. The idea is particularly attractive if the publisher can identify topics that are exceptionally timely, have especially broad appeal, or both. (More narrowly focused reprint books may be attractive, for non-economic reasons, if the publisher can be certain that there is an audience large enough to at least assure the recovery of the costs of production.) Also essential for the book's success would be the availability of promotional mechanisms that would enable the publisher to reach his audience; these mechanisms might include purchased or rented mailing lists, advertising in wide-circulation journals, etc.

Management Considerations

The publisher would have to support the editorial effort required to identify, acquire, evaluate, select, and obtain permission to use articles in the book. He would also have to bear the cost of producing, promoting, and distributing the book. He would need to have, or have access to, an order-fulfillment service. There should not be any extraordinary requirements for equipment, software, training, or personnel.

REPRINT JOURNAL

Description

As used here, the term "reprint journal" refers to a journal made up entirely of papers that have already appeared in other journals. Its purpose is to provide convenient access to literature on a certain topic, without the complexities or costs associated with starting a new journal.

The editors of the reprint journal would select articles from existing journals, obtain reprints of them, and (with the publishers' permission, of course) assemble them for printing in a journal format. Ideally, none of the papers would be recomposed. Presumably, some cutting and pasting would be necessary for make-up of the new journal. If there were great disparities in the page sizes or formats of the source journals, some papers might have to be composed afresh. If this were necessary, it should probably be done with a typewriter or other strike-on device. The journal would be printed and distributed in the usual fashion.

Each article would carry a notice identifying the journal in which it originally appeared, and giving the original date of publication, to facilitate proper citation. Authors with manuscripts in the area covered by the reprint journal would be directed to submit to one of the source journals. Some original material might be created for the reprint journal, but this should be kept to a minimum, to control cost.

Benefits

The reprint journal would be primarily a service to readers in a particular field. It would assemble for them, from disparate sources, articles of potential interest, as a convenience; it would do this at minimal cost. It should also tend to increase the visibility of the reprinted articles, exposing them to persons who might not otherwise have seen them, so authors might also benefit from the concept.

Problems and Limitations

The first problem that might face the editor of such a journal would be difficulty in obtaining permission to use reprints in this way. If the reprint journal were to be sponsored by a society that publishes a number of journals, and the reprints (or most of them) were to be drawn from the society's other journals, this problem should not be too serious. Basically, the editor of a reprint journal must persuade the editors of the other journals that his readers would be different from theirs—that he would not siphon off readers, or compete with the source journals.

The second problem is purely mechanical. As we said earlier, great variation in the physical characteristics (size and format) of the source journals could make it difficult to "homogenize" them into a new journal. A certain amount of variation would, no doubt, be tolerable; if, however, source journals were of very different sizes, with different line lengths, recomposition might be necessary.

Applicability

The idea of a reprint journal is likely to work best in topics that are inherently cross-disciplinary, or in ones which have not developed strong identities of their own. For the idea to have merit, a literature must exist, but it must be scattered. If the literature is distributed among a small number of regular journals (say, four or five), the possibility that the reprint journal would compete with its sources is a strong one, and the service that it would provide would not be very significant. At the other extreme, should the reprint journal try to draw articles from too many sources (say, more than 30) the editor might encounter difficulty in monitoring the original journals and managing relations with their editors.

Management Considerations

First, the person considering the introduction of a reprint journal should have a topic with the characteristics outlined above. (Alternatively, someone contemplating the creation of a new journal should ask whether a reprint journal might not meet the user community's needs, at a lower cost.) If adequate publishing opportunities in the selected topic exist, but are scattered among several other areas, the topic may be a good candidate for a reprint journal.

In this case, the interested persons should contact the editors of the journals that might serve as sources, and explore the possibility of arranging to use selected articles in the reprint journal. In the case of a society proposing to create a reprint journal out of the contents of its own journals, the situation would be relatively simple.

If satisfactory arrangements can be made, the sponsor will want to select an editorial board and editor(s), in the usual way. The editors will monitor the source journals and select items for the reprint journal. The decision involved in this will presumably hinge more on topical relevance than on quality, since the articles will already have been refereed. It may be possible for the editors of the reprint journal to receive titles of forthcoming articles in the source journals, and thus make their selection before the source journals have been printed and distributed. Cutting and pasting will probably be necessary for make-up of the new journal, but this should not require in-house personnel; it can probably be done better and less expensively by the printer. Quality control (corrections and alterations) should be a very minor consideration, since the papers will already be in final form. Aside from the editor, the only staff needed for such a journal should be secretarial personnel, to help assemble the issues and maintain liaison with the source journals.

BOUND, INDEXED JOURNAL VOLUME FOR SALE TO LIBRARIES

Description

Libraries generally have to make their own provisions for binding the journals that they subscribe to. This costs both time and money. The time journals spend in the bindery is often quite long—so long that some libraries enter multiple subscriptions to certain journals, in order to keep one set on the shelf while another is being bound. This is very expensive, and many libraries cannot afford it. There is also the problem that, by the time a volume year is over, and it is time to bind the issues, individual numbers may have been lost or physically damaged. This, too, leads some libraries, when they can afford it, to enter multiple subscriptions to the journals they need most.

It may be worthwhile for publishers to offer libraries and other institutional subscribers a special option to help them cope with the binding problem. When an institution subscribes to a journal, it could be given the option of reserving a bound volume at year's end. This cumulation would contain an index to the entire volume, and would be sent to the library shortly after the last issue in the volume. The publisher would record orders for the bound cumulations at subscription time, and would increase the press run for each number of the journal enough to provide the needed number of cumulations at the end of the volume year. As soon as the last issue of the journal was printed, the cumulations would be bound and sent to the institutions that ordered them.

Benefits

Both the library and the publisher might benefit from this idea. The library would be saved the inconvenience of having journals out of circulation while they are being bound, and would be sure of having a complete, physically perfect set of journal issues in its annual cumulation, without having to replace lost or damaged issues.

The publisher might be able to generate some additional revenue, if he could price the annual cumulation in such a way as to make it less expensive for libraries to order the special volume than it would be for them to order an additional subscription and make their own arrangements for binding.

Problems and Limitations

Careful, accurate cost-analysis and pricing are essential to the success of this idea. In addition to understanding his own costs, the publisher should be aware of the incidence of multiple subscriptions among his institutional subscribers, and the costs that they generally pay to have his journal bound. He must compete with the libraries' binderies or binding contractors, and, should he miscalculate his price, he might find himself without an audience. In the case of libraries that take out multiple subscriptions to his journal, he may also be competing with himself. Thus, he cannot afford to offer the special cumulations at a price less attractive for him than that of a journal subscription, unless he can be sure that the new option will find many more buyers than the old one.

Applicability

This idea should be worth investigating for any journal that has a significant number of libraries among its subscribers.

Management Considerations

As we have already pointed out, implementation of this idea should be preceded by a very thorough cost-analysis. Without this, the publisher may find himself without buyers, and losing money on the proposition. Even with this type of analysis, however, the actual demand for the special cumulation is a critical variable which may be difficult to predict. One way of introducing the option with minimum risk would be to announce its availability at subscription renewal time, but make it clear that, should demand be insufficient, the option would be cancelled. The publisher, on the basis of the cost-analysis he will have performed before announcing the option, should know where his break-even point will be (i.e., the number of orders needed to meet production costs). Should he receive enough orders to enable the option to break even, he can go ahead and plan to produce the cumulation. Otherwise, he will notify all subscribers who have ordered the extra option that there was not enough demand to justify it, and return their money.

PROMOTE SEPARATES (REPRINTS)

Description

Traditionally, most scientific publishers have viewed the distribution of separates, or reprints, as a service to authors and readers. A number of reprints are generally given, as a courtesy, to the author of a journal article—especially if he pays page charges. Readers have generally been advised to order reprints from authors; when the author's supply runs out, the publisher will sell them to individual readers, on request.

Several scientific publishers suggest that this view is mistaken. They say that the sale of separates can generate considerable revenue, and make a substantial contribution to the development and maintenance of viability for a scientific publishing operation.

Composition is the most expensive single component of most scientific publishing, averaging about 50% of total production costs. In the case of separates, composition has already been done and paid for as part of basic journal production. Development of a market for separates thus amortizes the cost of composition over a larger number of copies.

Separates can be produced in two ways. During journal printing, the publisher may "overprint," or exceed the required number of copies by some specified figure. Alternatively, or additionally, separates may be produced after the journal itself has been printed, using special "reprint" presses. These presses are designed exclusively for low-cost, short-run printing, and are much less expensive to use than the larger presses used in book-work. (The publisher has an optimization problem here. Depending on the number of separates desired, it may be preferable to merely overprint the desired number of copies, or use a combination of overprinting and reprinting.)

Separates, then, can be produced for a comparatively modest increase in the cost of publishing a journal. They can be priced, however, at a rate much higher than that charged for each article in the journal, if we compute the price per article as a fraction of the total subscription price. (Consider, for example, a hypothetical monthly journal. The journal carries an average of ten articles in each issue, and sells for $25 per year. The price per article is thus about 21¢; the average price per article for separates would probably range from $1 to $2.)

Of course, demand for the journal is much greater than that for separates, and is so partly because the price of an article in the journal package is lower than that of the same article purchased as a separate. Our point, though, is that a relatively small increase in the distribution of separates may have a very favorable effect on the publisher's overall financial outlook, because the difference between manufacturing cost and price is far greater in the case of separates than in the case of articles in the journal itself. In fact, publishers who have made a conscious effort to develop separates as a source of revenue generally calculate the cost of manufacture and distribution for each separate, then establish a price several times higher.

Promotion of separates as a source of income can go far beyond advertising. Several other entries in this Guide are concerned with promoting the awareness of journal contents; this should result in at least some increase in the demand for separates. The publisher can go still further, however. At least one scientific publisher now solicits a certain number of invited papers for journal publication, based on their anticipated appeal as separates. This is an interesting reversal of traditional practice. Ordinarily, if a paper by a particularly distinguished scientist were to appear in a journal, the editor would specify a larger-than-usual number of offprints or reprints. In the present case, this is inverted: a large demand for reprints is considered the objective, and the editor tries to locate authors and topics that can reach this.

Benefits

The immediate, concrete benefit of the development of separates as a source of revenue is added income for the journal. A successful program for the sale of separates can help to mitigate the unfavorable economics of journal publishing. There are other benefits, however, that are less tangible. The development of a market for separates generally means broadening the audience and the appeal of the scientific publisher, or reaching more readers. Aside from the "spillover" effect it might have on journal subscriptions (and membership, if the publisher is a scientific society), enlargement of the publisher's audience should be beneficial for his other activities: special publications, meetings, and the like.

Problems and Limitations

Although a separate article can be sold at a price much higher than that of an article appearing in a journal, there are expenses associated with distributing it that must be included in its price. First, the publisher must pay for the storage of the reprints. Ordinarily, he will store them at the printer's or have the printer arrange for their storage. The cost of this is not high, but it continues, and it grows with each title added to the inventory.

Second, the publisher must pay the costs of order-fulfillment. This involves receiving and recording orders, transmitting them to the printer (or whoever stores the separates), locating the separates for each order, and mailing them. In addition, the publisher must pay for the filing and bookkeeping associated with the sale of reprints.

Finally, the cost of advertising separates must be considered an expense that their sale should defray.

In some areas, the demand for separates may be so small that they are worth little investment and promotion. This is most likely in very narrowly focused areas that involve extremely small groups of people. In any field, however, no matter how broad, the demand for reprints will be extremely uneven. The likely state of affairs is that a relatively small number of papers will prove extremely popular, with little demand for the remainder. The editor may be able to predict which articles will have unusual potential for sale as reprints, and have a substantial number of these prepared as separates when the journal is printed. It would probably be worthwhile to feature the titles of some of these broad-appeal articles in the materials that promote the separates program.

Applicability

This idea is most appropriate in fields in which the potential audience for individual articles extends significantly beyond the subscription bases of the journals in which these articles appear. In the case of basic research, or very narrowly focused topics, this appeal may not exist. Even here, however, it may be possible to identify certain articles that should appeal to a wider audience than that which subscribes to the journal.

Management Considerations

The publications manager who wishes to develop an active program of separates-distribution must do four things. He must develop some notion of whether a market for separates exists. He must analyze and understand his manufacturing costs, so that he can develop a sensible system of pricing separates. He must select one or more approaches to promoting the separates (several methods are described elsewhere in the Guide). Finally, he must be sure that his order-fulfillment mechanism can accommodate an increase in the demand for separates.

SECTION II

PRINT-ON-PAPER ALTERNATIVES TO CONVENTIONAL PUBLICATION

Some interesting possibilities have been developed for producing somewhat non-conventional publications, while still adhering to the print-on-paper medium. Several possibilities of this type are described in this section of the Guide.

SYNOPTICS

Description

Brief articles have been given several names: "brief literatures," "condensates," "synoptics," etc. Of these, the one that has acquired greatest currency (though it is by no means universally used) is "synoptic." The precise specifications of a synoptic (length, organization, content, format, and so forth) vary from one publisher to another, but a general definition is not particularly difficult.

Gordon Dugger, of the American Institute of Aeronautics and Astronautics, has defined a synoptic as:

> a concise presentation of the key ideas and results of a longer paper or report in an easily grasped and directly usable form, including the definitions, assumptions, and input data essential to the understanding and use of the product (output) presented. The product may be an equation, a design, a concept, a figure, a table, a design criterion, a technique, or a combination of such things. This requirement for direct usability sets a Synoptic apart from an abstract or the traditional conclusions section of a paper. A Synoptic is backed up by a full paper or report and is reviewed by experts before publication; these characteristics set it apart from the Notes published in our journals.

Synoptics are different from abstracts in another way, too: they are significantly longer. Most journals that publish synoptics have settled on a two-page limit (about 1200 words). Thus, whereas an abstract might be about 5% of the length of a full article (and would almost never reach 10% of the article's length), a synoptic would be about 20-40% as long as the average journal article.

Because the synoptic's informational and intellectual integrity must be as high as the full-length article's, synpotics *must* be author-prepared.

A journal that publishes synoptics will provide for the ordering of the full-length papers; each journal issue would carry price and address information as required (some journals have special order-form cards bound or inserted in each issue, to simplify the reader's task). The publisher could then fulfill orders for the full-length articles directly, or arrange for orders to be filled from an external depository.

Author-prepared manuscript may be used as camera-ready copy for make-up of the synoptic journal, for the full-length articles (which will be distributed on demand, as separates), or both.

Full-length articles could be disseminated on microfiche, either exclusively, or as an alternative to hard-copy. The publisher might prepare bound or microfilmed editions of all papers that had been synopsized in the journal, for sale to libraries.

Benefits

Synoptics can be attractive to reader, author, and publisher. Because of their conciseness, the reader can cover more articles without investing more time, or reduce the amount of time invested in "skimming" current literature.

For the publisher, synoptics can significantly reduce production costs, because they save paper. The publisher, therefore, can produce a slimmer journal, or he can publish more items within the same page budget, reducing the journal's backlog.

In addition, publishing synoptics allows both the publisher and the author more flexibility and scope than they have with conventional articles. Since a page-limitation will be applied to the synoptics, there is no need to limit the number of pages in the full-length articles (which may be priced according to their length, so as to assure recovery of duplicating costs). The author, therefore, is free to make his communication as long as he thinks it needs to be; the publisher can accommodate long communications as well as short ones, so long as they can be synopsized.

Problems and Limitations

Authors may resist conversion to synoptics for two reasons. First, the scheme requires that they produce three versions of their communications–full text, abstract, and synoptic. Second, if a journal converts only part of its contents to synoptics, those authors whose articles are carried in the brief format may feel that, at least by implication, their articles are considered inferior to those printed in full.

At the same time, if fulfillment of orders for full text is not rapid and efficient, users may be dissatisfied.

Adoption of synoptics constitutes a significant, visible departure from conventional practice, and the publisher should be prepared for some negative reactions.

Management Considerations

If the conversion to synoptic communications is to be successful, it is absolutely essential that the journal editor(s) be committed to the scheme, prepared to work with authors who have difficulty adjusting to the new format, and ready to weather some criticism. The editor and publisher should be prepared to make clear the benefits of synoptics, to offset any unhappiness that authors or readers may express at the change.

The best way to introduce this scheme is probably for the publisher simply to decide that it is worthwhile, and announce it, rather than surveying authors and readers before implementation to determine whether they would accept the change. Because it is novel, this method of publishing will inevitably encounter some resistance; the publisher must be prepared to accept this. He must also try to introduce the change in such a way as to minimize any impression that use of synoptics degrades communication or implies distinctions in quality. For example, it might better to convert all (or almost all) of a journal's contents to synoptics, rather than intermix synoptics with full-length articles. If the two formats are intermixed, some authors and readers will infer that the articles that are treated synoptically are in some way inferior or less significant than papers published in full. It is important that the synoptic be considered a citable, formal publication, eligible for awards.

The publisher will have to prepare guidelines for authors to use in writing the synoptic versions of their articles. These guidelines should be very carefully prepared, in order to minimize the authors' burden in preparing a third version of their communications.

Special hardware and software will be required only if the publisher wishes to automate the distribution of full-text articles or wishes to distribute them in microform. Office copying equipment may be used for reproduction of the full-length articles.

It is important that fulfillment of orders for full articles be prompt and efficient, but in most cases the publisher's regular system for distributing reprints can be adapted to serve this purpose. The publisher must understand that the duplication and distribution of the full articles is different from the regular handling of reprints. In the synoptic system, a depository must be created for the full articles; these will probably be reproduced only on demand, or in limited quantity after the first orders have been received.

Editorial personnel must be familiar with the publisher's requirements (stylistic and organizational) for synoptics, and able to explain these to authors. Clerical personnel will be needed for duplication of full-length articles, and for processing orders for them.

Source of Additional Data

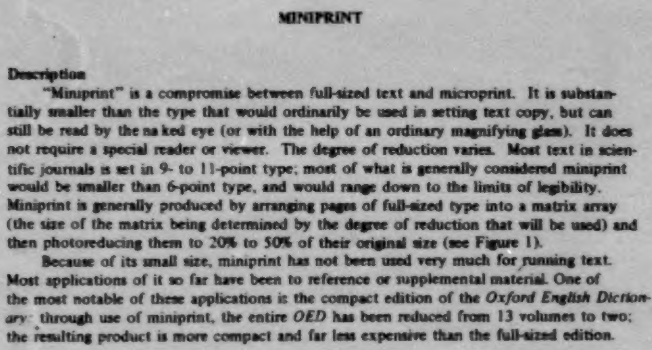
"AIAA Experiments and Results on SDD, Synoptics, Miniprints, and Related Topics," by Gordon L. Dugger *et al.*; *IEEE Transactions on Professional Communication*, Volume PC-16(3), September 1973.

MINIPRINT

Description

"Miniprint" is a compromise between full-sized text and microprint. It is substantially smaller than the type that would ordinarily be used in setting text copy, but can still be read by the naked eye (or with the help of an ordinary magnifying glass). It does not require a special reader or viewer. The degree of reduction varies. Most text in scientific journals is set in 9- to 11-point type; most of what is generally considered miniprint would be smaller than 6-point type, and would range down to the limits of legibility. Miniprint is generally produced by arranging pages of full-sized type into a matrix array (the size of the matrix being determined by the degree of reduction that will be used) and then photoreducing them to 20% to 50% of their original size (see Figure 1).

Figure 1



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Because of its small size, miniprint has not been used very much for running text. Most applications of it so far have been to reference or supplemental material. One of the most notable of these applications is the compact edition of the *Oxford English Dictionary*: through use of miniprint, the entire *OED* has been reduced from 13 volumes to two; the resulting product is more compact and far less expensive than the full-sized edition.

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In scientific publishing, miniprint has found its greatest use in journal articles. A few journals have used miniprint for entire articles; more generally, however, miniprint has been used for information that supplements the basic content of a journal article. This information could include detailed descriptions of experiments, data resulting from the experiments, or the like. The miniprinted information accompanies the article, either in a block at the article's end, or stripped onto the lower half of the page carrying the text to which the supplemental information relates. Within the miniprint section, some material (e.g., graphics) may be carried in full-sized type, or in type significantly larger than most of the miniprint.

Generally, miniprint is created from author-prepared copy. The publisher gives authors guidelines with instructions as to which material should be carried full-size, and which should be miniprinted. If author-prepared copy is used, page charges are usually reduced or not assessed at all on the miniprinted material. (SEE ALSO: I.1.1–Author-Prepared Camera-Ready Copy.)

Benefits

Use of miniprint saves money for the publisher, because it uses less paper and space, and saves shelf-space for the reader, because it results in a more compact publication. If the publisher uses author-prepared copy for the miniprint, some additional savings may be realized in composition costs, although this will be offset if the publisher waives page charges for this material.

For authors, publication in miniprint may be attractive if the journal has strict page limitations or heavy page charges. Use of miniprint may permit the author to include in his published paper information that would otherwise be excluded.

For the reader, the appeal of miniprint is relative: compared to microform, miniprint is relatively convenient, since no special equipment—beyond, perhaps, a pocket magnifier—is needed to read it. The compactness of miniprint should appeal to some users.

Problems and Limitations

Some users object vehemently to miniprint. Their objections may be partly satisfied by limiting the degree of reduction, so that the miniprinted text may be read, at least for short periods, without a magnifier. Also, the publisher may, as we have said, publish only supplemental material in miniprint, so that material necessary to the comprehension of an article's main points will be published full-size. Both of these measures have the disadvantage of compromising the appeal of miniprint for the publisher, in that they decrease the the amount of publishing space that he can save.

Authors may object to miniprint, especially if the publisher requires that they submit in camera-ready copy the material that will be miniprinted. This objection, however, is not based on a dislike of miniprint itself; rather, it is identical to resistance to any use of author-prepared camera-ready copy. (Some authors, on the other hand, react very enthusiastically to miniprint because it permits them to include more ancillary information in their articles.) Waiving page charges on miniprinted material is one way of compensating authors for the extra trouble they must go through to prepare camera-ready copy. However, if the publisher does this, whatever savings have been achieved through reduction of composition and paper costs will be decreased by the loss of revenue from page charges. The publisher, therefore, should carefully analyze the impact of the various options before committing himself to any one of them.

A publisher who adopts miniprint should expect some objections from readers. These will probably be few, but emphatic. One major scientific society, shortly after adopting miniprint for experimental sections in certain journals, received a letter of complaint—in miniprint! The publisher will be well advised to prepare very specific and convincing arguments regarding the savings achieved through the use of miniprint.

Applicability

The basic fact to bear in mind when considering miniprint is that it is essentially a cost-saving measure. The savings are realized from miniprint's compactness; this compactness constitutes a secondary benefit. The situations in which publishers will want to consider miniprint, therefore, should be those in which cost-reduction is a major objective. Because miniprint reduces costs by saving paper, savings will be greatest in publications that have long print runs.

Conceptually, miniprint is a compromise between full-sized text and microform. Strictly from the viewpoint of cost-reduction, microform will be more attractive to the publisher, particularly for large-circulation publications. Because of the inconvenience of microform for users, however, the compromise that miniprint provides may be the best way of controlling publishing costs while moderating user inconvenience. (It also avoids the complexities of dual-media processing for the publisher.)

Another factor that the publisher must consider concerns the material that will be treated in miniprint. As we have said, the applications of miniprint that are least likely to offend readers are those in which essential text is published in full-size, while ancillary material appears in miniprint (i.e., use miniprint for "look-up" rather than reading). Distinctions of this sort are not practical in all fields, nor for all types of journals. The distinction can be most readily made in "experimental" journals; the argumentation and information of general interest can be concisely reported in the main portion of the paper, while the information that would be needed to replicate the author's experiment, and the detailed results of the experiment, can be relegated to miniprint. Publishers of journals whose contents cannot be "partitioned" in this way might be well advised to first turn their attention to innovations other than miniprint (e.g., synoptics) that may help them control costs.

Management Considerations

Since the positioning of the pages that will be photo-reduced is critical for the appearance of the printed publication, the publisher will probably want to make up the miniprinted pages in-house. This will require a light table and a board artist. The photo-reduction can be done by the printer; it does not require unusual equipment, and the cost is minimal.

The publisher will need to prepare guidelines for authors, covering the selection and organization of material that will appear in miniprint. If the publisher plans to use author-prepared copy for the miniprint sections of his journal, these guidelines must also include requirements for the appearance of the copy. The publisher may even want to provide authors with special "blue-line" paper for the sections that will appear in miniprint.

The publisher may wish to supply readers with a magnifier that they can use to read the miniprinted sections of the journal. There are two advantages to this: first, he can select a magnifier appropriate for the degree of reduction and the format that he uses; second, the psychological impact of this evidence of his concern for the reader's convenience may help to forestall some resistance to the miniprint.

Sources of Additional Data

"AIAA Experiments and Results on SDD, Synoptics, Miniprint, and Related Topics," by Gordon L. Dugger *et al.*; *IEEE Transactions on Professional Communication,* Vol. PC-16(3), September 1973.

"Problems Related to Journal Subject Coverage, Formats, and Packaging," by Seldon W. Terrant; *IEEE Transactions on Professional Communication,* Vol. PC-16(3), September 1973.

SELECTIVE DISSEMINATION OF INDIVIDUAL ARTICLES

Description

The conventional scientific journal is a "package" of articles that the publisher and editor believe are germane to the interests of many, if not all, of the journal's readers. This matching of articles to reader interests, however, is presumptive, not empirical; the editor does not ask readers whether they are interested in a certain article before it is published. Very seldom, in fact, are readers ever asked whether a journal's contents are pertinent to their interests; the publisher assumes that a reader's decision to subscribe indicates a positive match.

Several studies, however, have shown that the average readership for any single journal article is quite low. This suggests that, as a means of bringing information to the people who want it, the traditional journal may be inefficient and wasteful–many more people are exposed to the average article than want to read it. Because of this, several publication systems have been developed that do *not* depend on the kind of pre-packaging that the conventional journal involves. Instead, they try to give the reader greater selectivity in the papers that he will receive. Their ideal is to permit the reader to receive all articles whose contents match his interests–and no others.

All of these systems, then, are based on the idea of disseminating articles selectively; hence, their names: Selective Dissemination of Separates, Selective Dissemination of Documents, etc. Although all systems for selective dissemination of single articles derive from a common basic concept, they differ considerably in the mechanisms whereby they try to give the reader control over the selection of material that he will receive.* There are two basic approaches to this: actual selection and ordering of individual articles by the reader ("Type-A"), and dissemination of articles according to pre-established interest profiles ("Type-B"). These approaches may be used separately or in combination.

In its simplest, purest form, direct selection of articles by the reader would work something like this: at regular intervals (once each week, month, or quarter), the publisher would send the reader an announcement of all newly available articles. This announcement might contain only bibliographic citations, citations with abstracts, or citations with longer summaries (similar to Synoptics [II.1]). The announcement would contain an order form, which the reader would use to identify the particular articles that he wished to receive. Price information would be included with each citation, and the reader would include remittance with his order. In some respects, this resembles the usual ordering of separates. However, in this case the announcement would replace the journal. Readers would subscribe to the announcement circulars, and pay an additional item fee for each article they ordered.

Dissemination of separates according to interest profiles represents a compromise between the system just described and the conventional journal. In this case, the publisher creates "interest profiles" for the readers. A separate profile may be created for each individual reader, or a smaller number of more general profiles may be developed for groups of readers. The profile consists of index terms (descriptors), possibly weighted, chosen to reflect readers' interests. As each new reader enters the system, a profile is made for him, or he is assigned to a group. He is given an opportunity to review the terms that make up his profile, and to see the collection of articles that they produce. After his profile has been validated, the selection of articles is automatic. The publisher will maintain all profiles in computer-readable form, and periodically run these against the index terms associated with all new articles. Articles are automatically sent to any profile with matching index terms.

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* It is important to appreciate the difference between the selective dissemination of articles and the selective dissemination of titles and abstracts. The latter, which is strictly a bibliographic alerting service, has come to be known generally as Selective Dissemination of Information, or SDI; the name is misleading.

As we have said, these two approaches to selective dissemination may be combined. In a hybrid application, profiles would be created. Instead of automatically receiving all the papers that matched his profile, however, the reader would receive only the citations (as in an SDI system). He would then select the articles he wanted, and order them.

Selective dissemination is clearly designed for the individual reader. For libraries and other institutional subscribers, the publisher should plan to collect and bind all articles processed through the system, and sell them at institutional subscription rates.

Benefits

The reader is the prime beneficiary of selective dissemination of documents. If the system works well, he may receive more articles that relate to his interests than he could obtain by simply subscribing to journals. At the same time, selective dissemination should offer a much greater probability than the conventional journal that each article received will be of interest.

Problems and Limitations

The benefits of selective dissemination come at a very definite cost. With present processing technology, it is almost always more expensive for the publisher to offer the reader greater selectivity than it is to assemble articles into a conventional journal. Although readers usually find the prospect of greater selectivity attractive, it is not at all certain that they would be willing to pay for it at a level that would permit the publisher to recover his costs. In other words, although selective dissemination is very attractive in the abstract, the publisher may find that price resistance would prevent its achieving viability.

Moreover, there may be other psychological problems. Under certain circumstances, a reader may receive fewer papers under selective dissemination than he would with a journal subscription, and have to pay more for these articles than a journal subscription would cost. In essence, he would be paying for a service to weed out the "noise" (articles of little or no interest) inherent to broad-spectrum journals, delivering only those materials of direct interest. Even if the cost of this service does not exceed that of a journal subscription, there is probably some lower threshold (in terms of number of papers received) beneath which readers would be dissatisfied with selective dissemination.

Selective dissemination is also likely to reduce serendipity. The significance of this is not easy to assess.

The creation, maintenance, and updating of interest profiles—essential to "Type-B" selective dissemination's success—may present problems. Similarly, the pricing of selectively disseminated articles may be difficult and complicated. One cannot readily apply to such a system the pricing and payment mechanisms used in more conventional systems for the distribution of separates. In all probability, the publisher will find it necessary, because of the cost of establishing a user's profile or sending him an announcement bulletin, to levy a basic charge (subscription or entry fee) for use of the service. The number of items that any given user will receive under the program, however, will vary and may be difficult to predict. Therefore, fairness to both user and publisher will probably require a per-item charge for each article that the user receives. It would be complicated and dangerous for the publisher to exact this payment after mailing articles to the user; the publisher may prefer to establish a system whereby the user deposits a certain amount of money in a special account, then draws against the deposit as he receives individual articles. This system also presents certain problems. Because entry into and exit from the program cannot be expected to occur with any regularity, the publisher may find it difficult to systematize promotion, bookkeeping, and subscription.

The stockpiling and reproduction of the separate articles also present some problems. At what point, and in what quantity, should the publisher reproduce the individual articles? Should they be reproduced before orders are received? Individually, for each order? In batches, after a certain number of orders have been received? Can the publisher predict the approximate demand for any particular article?

Similarly, the publisher must make several decisions concerning the distribution of articles. In the case of a program that depends on distribution of separates according to interest profiles, the publisher must decide whether to disseminate the separates in a continuing stream, as soon as they are through processing, or to batch them and send them out at regular intervals. In the case of a system that uses an alerting announcement, with users placing individual orders for selected articles, the publisher must take particular care to see that the order fulfillment mechanism works rapidly and accurately.

Applicability

The applicability of selective dissemination depends on several factors. First, the publisher should be processing a substantial number of papers (otherwise, there is little need for selectivity). Second, the subject matter of the papers, and the interests of the publisher's audience, should be relatively heterogeneous, for the same reason. Third, the publisher must have processing capabilities adequate to support the system.

In the case of the program based on interest profiles, this definitely requires a computer: the mechanics of matching a large number of papers against interest profiles, not to mention the bookkeeping that this system would require, would virtually prohibit manual processing.

In the case of a system that uses an announcement bulletin, the major processing requirement would lie in the order-fulfillment mechanism. User acceptance of such a system would depend in large measure on the speed and accuracy with which the publisher could process orders for separate articles. Since placement of orders by mail introduces a certain irreducible delay, the publisher's in-house processing of orders should be especially rapid (on the order of twenty-four hours from receipt of an order to the mailing of the documents). The publisher might consider offering users the option of placing orders by telephone, to speed the delivery of needed documents.

Management Considerations

Successful implementation of any system for the selective distribution of individual articles will require very careful analysis and planning by the editor and publisher. First, they must determine that the literature that they publish and the size and breadth of their audience are substantial enough to justify selective dissemination. Second, they must make sure that they have the processing capabilities (human, computer, reprographic), tools (for literature analysis and computer processing), and facilities (for document storage) that such a program will require.

The publisher should try to learn whether his users are interested enough in the advantages of selective dissemination to make development of a system worthwhile. To do this, he will have to thoroughly analyze the costs that selective dissemination would entail, and compare them with the cost of publishing in the usual way. He may want to survey his users, to gauge their interest in selective dissemination and their readiness to pay for it. He will have to develop a pricing mechanism that is simple enough to be manageable, but that will relate, as closely as possible, the price users pay to the amount of material they receive, in the interest of fairness and to permit the system to sustain itself.

As mentioned, the form of selective dissemination that relies on interest profiles will require a data-processing capability. Since the processing consists mostly of rather straightforward sorting procedures, the computer system need not be terribly sophisticated. It must have enough memory to contain all of the index terms, titles, interest profiles, and subscriber names involved in the program. Some programming will be required; the publisher will need access to a systems analyst and a computer operator. It may be possible for the publisher to use a service bureau for his data-processing requirements.

Some special personnel will be needed for almost any system of selective dissemination. In the case of a system that uses interest profiles, special personnel will be required to help users prepare and validate their profiles. These persons should be indexers or literature analysts, experienced in dealing with the literature that the system processes. These same persons will have to monitor (if not perform) the indexing of articles processed through the system and be on hand to help users who need to modify their profiles.

In the case of a system based on the ordering of single documents, special clerical-level personnel will be needed to reproduce documents and process users' orders. Office copying equipment may serve for the reproduction of articles, but if the traffic in copying is very heavy, a copier may have to be dedicated to the dissemination program. (N.B.: office-copier reproduction can be expensive.) The publisher may find it necessary to develop special procedures to facilitate the rapid processing of requests. He may also find the bookkeeping required by the system to be so complex as to require special personnel or systems.

Sources of Additional Data

"AIAA Experiments and Results on SDD, Synoptics, Miniprints, and Related Topics," by Gordon L. Dugger *et al.*; *IEEE Transactions on Professional Communication,* Vol. PC-16(3), September 1973.

"Separate Article Distribution as an Alternative to Journal Publication," by David L. Staiger; *IEEE Transactions on Professional Communication,* Vol. PC-16(3), September 1973.

"SPEEDI–A Better Information System," by Ajit Singh *et al.*; *Journal of Chemical Documentation*, Vol. 14(1), 1974.

For a description of an interactive SDI system in Czechoslovakia, see:

"Performance of an SDI System with Interactive Features," by Viera Saskova and Jiri Kosik; *Journal of Chemical Documentation*, Vol. 14(2), 1974.

RAPID, INFORMAL DISSEMINATION OF RESEARCH INFORMATION

Description

This concept is basically that of the information exchange group (IEG), and resembles the "letters journal." In essence, it is a formalization and enlargement of the phenomenon now generally referred to as the "invisible college." Its purpose is the speedy dissemination of preliminary and inconclusive research findings. It differs from the invisible college chiefly in having an official sponsor, and in involving formal, orderly distribution.

The mechanism for dissemination under this concept is a periodical document, similar to a newsletter, that contains unrefereed, informal communications. Communications are batched and reproduced as quickly and cheaply as possible, using author-prepared copy. The letters are *not* intended to have archival value. Contribution to this system is not considered formal publication, since the communications are not refereed. The frequency of issue need not be regular; it would be calculated to maintain the smallest possible backlog, so that communications would be disseminated as promptly as possible.

Benefits

This type of communication can be extremely useful to persons doing research. It makes some information available long before it is reported in the formal literature. It also makes generally available information that would otherwise have been accessible only to members of the invisible college.

Problems and Limitations

One problem with this type of dissemination is that it has a tendency to evolve into a conventional journal. From one point of view, this may not be unfortunate; there may be a need for another journal in the particular field. The unfortunate thing is that the function of the IEG is lost, or must pass on to some new agent.

As we have mentioned, a major feature of this type of information exchange (and the characteristic that sets it apart from the invisible college) is its institutional sponsorship. A very definite problem arises whenever a publisher tries to sponsor an unrefereed publishing program. In some cases, this problem has been circumvented by controlling access to the IEG. This essentially referees the person, rather than his communication.

It is important for the publisher to realize that this problem (the propriety of unrefereed communication) will arise, and understand that he must present the concept very carefully, in order not to have it destroyed by those who cannot tolerate the abandonment of refereeing. It is also important that he recognize that the introduction of refereeing into the system would inevitably diminish the speed with which communications could be disseminated, and vitiate the contributors' freedom.

Management Considerations

The editor or publisher who has in mind a topic that he thinks is a likely candidate for this kind of information dissemination should try to investigate the informal means of communication that workers in that area already use; this may help him to design the details of the IEG. The design and the presentation of this system will be very important, particularly if he has to contend with a governing board that is antagonistic to the idea of unrefereed communication.

Promotion of the information exchange group can be accomplished through editorial announcements in journals and through direct mail to selected individuals. Individuals who respond may be asked to suggest the names of other persons who might be interested.

When the system is established, the publisher should be careful to see that the ground-rules are clear, that they are generally understood, and that they are adhered to. Otherwise, as we have said, this system is likely to gradually become a journal.

SERIAL BOOKS

Description

Some books take a long time to prepare *in toto*, although certain portions of them could be distributed much earlier. One societal publisher has developed an innovative way of dealing with this situation: the book with this problem will be published serially, one chapter at a time, as each becomes ready. The entire process is expected to take about two years; at the end of that time, the book will be made available in its entirety. Readers can obtain the book in one of two ways. They can place a standing order with the publisher, so that they receive each chapter of the book as it is produced. Alternatively, they can selectively buy individual chapters that interest them, as separate documents.

Benefits

This method of dissemination principally benefits the reader, who receives information as it becomes available, rather than waiting until the last piece is in place. Under certain circumstances, this method of dissemination might also benefit the publisher (as in the case of a book in which some sections had broader appeal than others, and so might experience unusual success as separates).

Problems and Limitations

This is not the most desirable way of disseminating the contents of a book. It merely seeks to minimize the delay between preparation of material in publishable form and delivery to readers.

Management Considerations

The publisher who chooses to release a book in this way should try to see that the entire process is concluded as quickly as possible. He should also be sure that his mechanism for maintaining and fulfilling standing orders for the individual sections of the book is adequate.

The publisher, to maximize his income, might offer an option whereby readers could both place a standing order (receive the chapters of the book as they become available) and receive the entire volume when it is available.

SECTION III

NON-PRINT-ON-PAPER AND MIXED-MEDIA INNOVATIONS

A number of possibilities have already been developed that can be considered alternatives or supplements to conventional forms of primary dissemination. These possibilities include various uses of micrographics, computers, and audiovisual systems. Clearly, some of these forms of communication will become increasingly important and attractive as time goes on.

JOURNALS ON MICROFICHE (AS WELL AS PRINT-ON-PAPER)

Description

Microfiche, at present, is the most convenient microfom for the individual reader. A number of scientific publishers–mostly scientific societies–now offer their journals in both print-on-paper and microform, as alternative subscription options. Micro*film* subscribers are almost exclusively institutions. Micro*fiche*, on the other hand, is an option that some individual subscribers choose as an alternative to paper.

Most publishers who offer journals on microfiche charge the same price for a microfiche subscription as they do for the paper ("hard-copy") version, despite the fact that the cost of manufacturing the microfiche is much lower than that of producing the hard-copy journal. The rationale for charging as much for a microfiche subscription as for hard-copy is that, from the publisher's viewpoint, the two are in competition for the same readers.

If the price of the microfiche version were commensurate with its cost, according to this view, it might draw substantial numbers of subscribers away from the hard-copy journal. This would drive up the unit-cost of producing the hard-copy version, since much of the cost of journal publishing is in fixed expenses (notably composition). (If fewer copies are printed, each copy must bear more of these fixed costs, so the unit-cost goes up.) This would force the publisher to raise the price of the hard-copy subscription. Because this prospect would be unwelcome to both publisher and subscriber, publishers are reluctant to price the microfiche edition at levels that they feel might jeopardize the viability of their basic print-on-paper publishing operation.

Some journals are offered, however, in a dual-subscription format designed to capitalize on both the compactness and inexpensiveness of microfiche. In this option, the person who subscribes to a journal in *both* hard-copy and microfiche receives them at considerably less than the cost of two single subscriptions. The rationale behind this views the hard-copy journal as a current-awareness tool. The subscriber can remove any single article that particularly interests him, then discard the copy. He would save the microfiche, so that he would have a complete collection of the journal in a fraction of the space required by the hard-copy. In this subscription option, the total price is lower than that of a double subscription, but high enough to make it profitable to the publisher.

Benefits

Within the present state-of-the-art of microform readers, offering a journal on microfiche as well as hard-copy is more a service to readers than anything else. To date, few readers have subscribed to the microfiche editions of journals that are available in both media. Publishers who have offered the option have not found it to be a profit-making venture, although it generally brings in enough income to pay for itself.

The last point is worth some further consideration. The economics of micropublishing are so much more favorable than those of print-on-paper publishing that a publisher can afford to offer the microform option, and have it recover costs, even though only a very small fraction of the total readership selects it (generally under 5%).

Problems and Limitations

We discussed one of the problems, or potential problems, involved with this dual mode of publishing, when we described the price arrangement established by most publishers who have implemented it. At the same time, there is another, more fundamental limitation, which partially neutralizes the danger that a journal's microfiche version might make significant inroads into the subscription base of the hard-copy version. Reader acceptance of microfiche journals has been very limited and slow to develop. Admittedly, this response might be somewhat greater if publishers' pricing policies did not make compactness the only advantage of the microfiche version. However, reader acceptance of microfiche generally has been very limited, even where it has been offered very inexpensively. This is largely because microfiche is still awkward and inconvenient to use, especially for reading (as opposed to reference) applications. The development of a more satisfactory microfiche system (SEE: IV.1–Novel Microfiche System) or improved readers (SEE: V.1–Inexpensive, High-Quality, Convenient Microform Reader) could greatly change this. Meanwhile, publishers who offer their journals in microfiche, as well as hard-copy, do so in the belief that people who *do* prefer to purchase their journals in this medium should be able to do so.

Applicability

Consideration of this idea is more a matter of the publisher's initiative than anything else. To date, no publishers that we know of have found any sign of substantial user demand for journal publication in this mode. The dual-publication scheme would increase the publisher's costs, although the increase should be modest. The same camera-ready copy could be used to produce both the microfiche and printing plates. The cost of producing a microfiche "master" is only a few dollars, while copies for distribution cost only a few cents.

Management Considerations

The publisher may have to locate a special contractor to produce the microfiche version of his journal. Some printers who specialize in scientific material can produce microform, but most cannot. If the publisher does have to deal with two different processors, he will arrange to have the printer send corrected page proofs to the microfilm contractor for arrangement and filming. The microfilm contractor may not be equipped to mail the journal, since many firms that do microfilming are not involved in publishing applications.

The publisher should carefully analyze the cost of micropublishing, and base his subscription price on an expectation of limited demand (high unit-cost and price). Availability of the microfiche version should be noted editorially in the journal, advertised in white space, and mentioned in the standard subscription notice in the hard-copy journal. User acceptance of microform has *not* been great enough to make a direct-mail campaign, or other special promotion to the journal's general readership, seem worthwhile. The institutional market might be somewhat more responsive, although libraries often favor roll microfilm over microfiche. The idea of a specially priced combination of hard-copy and microfiche, while unlikely to attract a great many subscribers, is worth considering, since it could almost certainly pay for itself.

CURRENT DISSEMINATION OF MULTIPLE JOURNALS ON MICROFILM

Description

Many scientific and technical journals are now available on microfilm as well as in hard-copy (print-on-paper). Usually, the microfilm edition is prepared at the end of the volume year, when the volume is complete. Subscribers to the microfilm edition receive the hard-copy version of each issue as it is printed, and the microfilm version at the end of the volume year. If the subscriber receives several journals from the same publisher, each comes on a separate roll of microfilm.

At least one major publisher has developed an alternative format for microfilm subscribers. Instead of preparing a short monthly microfilm for each journal, or a long annual cumulation, this publisher packages all of the issues of its journals each month onto one microfilm cartridge.

Benefits

This format makes possible prompt, efficient microfilm dissemination. This may be helpful to certain libraries.

Problems and Limitations

Subscribers to this option receive *all* of the publisher's journals, whether they want them or not. This makes the service expensive, and may limit demand for it. Moreover, there is no clear indication of a strong demand for current dissemination on microfilm. Libraries' use of microfilm is generally based on its compactness as a storage medium, particularly for seldom-used items. Current journals, on the other hand, are generally kept on display and heavily used.

Applicability

This method of distribution is appropriate only for publishers who produce a number of journals. Furthermore, the content of the journals must be homogeneous enough for some institutions to want to subscribe to all of them.

Management Considerations

If the publisher is already producing microfilm versions of his journals, and is preparing the microfilm only at the end of the volume year, conversion to this method of dissemination may required substantial schedule changes. Each journal issue must be microfilmed as it is produced, and the microfilm masters of all the journals collated for production of the total microfilm package.

The cost of distributing microfilm in this way will be higher than that of a year-end cumulation, since it will involve more mailings. This will have to be figured into the subscription price. On the other hand, subscribers to this microfilm package would not receive the journals in hard-copy, unless they subscribe to them separately. Thus, the cost breakdown for this service will be quite different from that of an "ordinary" microfilm subscription.

SUPPLEMENTAL MATERIAL ON MICROFICHE

Description

Material that supplements the basic content of a journal article (or other communication) may be distributed inexpensively and compactly on microfiche produced by filming author-prepared copy. Conceptually, this use of microfiche is one of several alternatives for the presentation of supplemental material (SEE ALSO: II.2–Miniprint). If microfiche is used, the fiche could be carried in a small jacket attached to the document's cover. If the document were offered on microfilm, as well as in hard copy, subscribers to the microfilm edition could receive the print-on-paper version of the journal each month, and the microfilm cumulation of all issues at the end of the volume year. The supplemental material would appear with the appropriate article in the microfilm edition; this same supplemental material would be presented on slips of microfiche in each issue of the print-on-paper version of the journal.

Alternatively, receipt of the supplemental material on microfiche might be made a separate subscription option, offering subscribers additional information at relatively modest cost.

Yet another method of dissemination would consist of having the microfiche supplements to journal articles maintained in a central depository. Readers of the journal would order microfiche supplements individually. Articles for which supplemental material was available would carry a statement to this effect, perhaps with a brief description of the supplemental material (number of pages, topics covered, etc.) and the price of the microfiche. (N.B: this option merges almost imperceptibly into the concept of Synoptics [II.1].)

Benefits

The benefit to the publisher is that he can make available more information than could conveniently be carried in a journal article, at a fraction of the print-on-paper cost. He thus provides greater service to both authors and readers, without incurring intolerable expenses. In the case of a journal faced with severe financial problems, the use of microform as a supplement to the printed journal might enable the publisher to maintain his journal's financial viability without degrading its intellectual integrity.

For the author, this use of microform provides an opportunity to make his communication much more complete than the "normal" format, with its strict page budgets. Moreover, he may gain this additional space at little or no cost, since most publishers who use microfiche in this way do not impose page charges on the materials to be carried in microform (because they use author-prepared camera-ready copy). The author who is writing for an experimental journal may find this particularly attractive, especially if he is describing a complicated experiment, or several different experiments in a single article.

The user may find this application of microfiche attractive for two reasons. First, it permits access to a great deal more information than was previously available. Second, if publication of supplemental material in microform is used to reduce the size of the printed journal, and if the reader is only superficially interested in most of the journal's contents, he may find the consequent compactness attractive.

Problems and Limitations

Most of the difficulty associated with this dual mode of publishing derives from the basic inconvenience of microform as a medium for primary communication. Microfiche is inexpensive to produce, easy to distribute, and conveniently compact for storage. To read it, however, one must have special equipment that is fairly expensive (one can still not buy a truly high-quality reader for less than approximately $100) and physically awkward, when compared to the convenience of the conventional print-on-paper format. In addition, microfiche, because of its very compactness, is easily mislaid or lost; this can present very annoying problems. Because of these negative characteristics, a significant number of scientists have a very strong antipathy for microform.

Consequently, the intellectual and economic appeal of using microform in this way is partly offset by the medium itself. Improvements in micrographic technology, and its increasing use, may be expected to moderate this, but for the near future the problem remains.

Applicability

Micropublishing of supplemental material is most applicable to journals whose articles can be readily divided into brief sections of general interest and longer sections of more limited interest, or to journals that carry articles which require massive substantiation. Most journals that fit these criteria are likely to be devoted to descriptions of experiments.

Micropublishing of supplemental material may also be appropriate for consideration by a journal faced with severe financial problems, if it meets certain conditions. First, the articles it carries must be susceptible to the disaggregation that this scheme requires. Second, the average length of the paper that it publishes, or the journal's circulation, must be great enough that the conversion to microform will bring a significant savings in paper. (Any savings realized through the elimination of composition for material presented in microfiche will be largely offset by the loss of page charges for this material.)

As mentioned in the preceding section, use of microform creates certain problems for the reader, and therefore may encounter considerable resistance. The publisher will be well advised to consider this carefully before embarking on any program of micropublishing. He should remember that a mixed publication program, of the sort described here, may actually meet more resistance than publishing in microform alone. (This is because the only subscribers to a journal disseminated solely on microfiche would, presumably, be persons without strong objections to the medium.) Consequently, the publisher considering a dual-media publication scheme might also want to give some thought to the possibility of publishing in microform alone.

Management Considerations

Adoption of this system of publication will require some careful preparation by the publisher. He will need to prepare guidelines for authors, covering both the editorial aspects of separating their material into its print-on-paper and microform components, and, if he uses author-prepared copy to generate the microform record, physical specifications for this component. Editorial personnel must be prepared to deal with authors' questions and problems, and will have to review the author-prepared copy before microfilming.

The microfilming itself will probably be performed on contract; some printers of scientific material can handle this. It is unlikely that the publisher would want to acquire the equipment and personnel necessary to perform the microfilming in-house.

If microfiche are to be distributed with copies of the printed journal, the publisher must make some provision for this in the design of the journal. The simplest such provision would be to affix a paper jacket or pocket (similar to that used in the back of a library book) to the cover of the journal. The publisher will remember, however, that microfiche are easily lost, so he may wish to purchase, and make available to his readers, special containers for storing microfiche, to minimize this likelihood.

The publisher will need to arrange for maintenance of the microfiche supplements, either in-house or in an external depository. He will also need to develop a mechanism for microfiche order-fulfillment as promptly as possible, recalling that a large measure of the success of any incremental system of publishing will depend on the speed with which orders are processed.

Source of Additional Data

"Impact of Microfilms on Journal Costs," by Joseph H. Kuney; *IEEE Transactions on Professional Communication,* Vol. PC-16(3), September 1973.

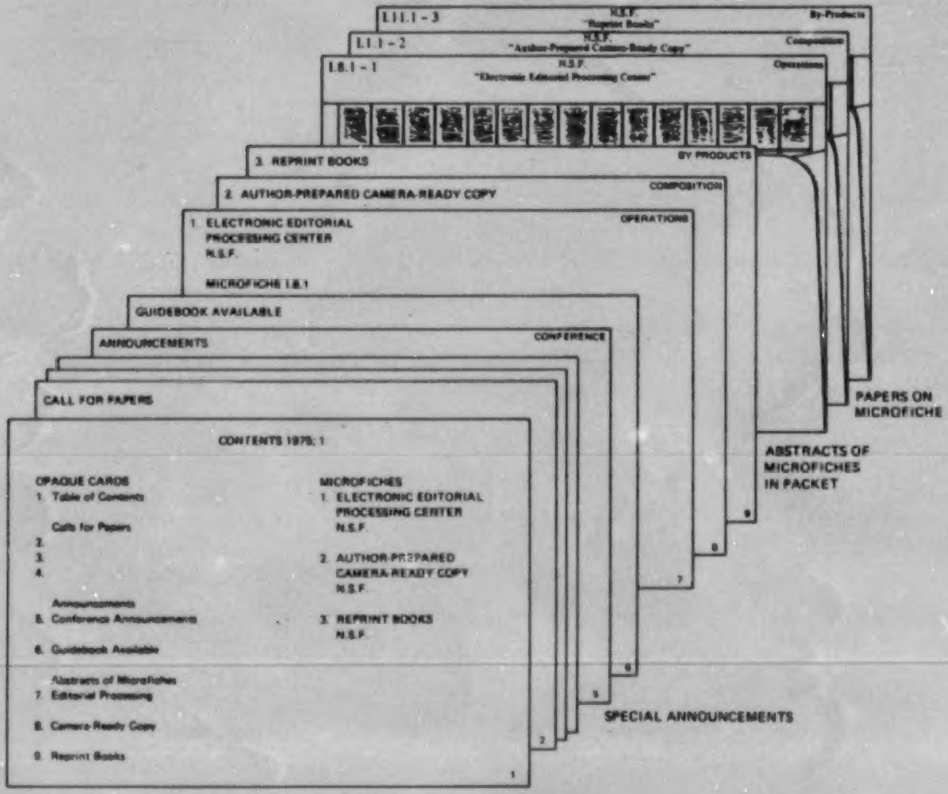
JOURNAL PUBLISHED EXCLUSIVELY ON MICROFICHE

Description

Most applications of micrographics have used microform as an archival medium for reference material, because of its compactness and inexpensiveness. Because it is awkward to use, it has seldom been used as the sole medium for primary communication (i.e., the communication function performed by the scientific journal). Its very low cost, however, makes microform worth considering for this purpose, in certain cases. And, in fact, at least three journals are published exclusively on microfiche (one began micropublication in 1959!).

A journal published only on microfiche does not look at all like a print-on-paper journal. The conventional ("macroform") journal is the familiar bound document; in contrast, a microfiche journal would consist of a paper packet, containing a number of individual microfiche, each housed in a jacket or envelope (see Figure 1). Identifying information (author, title, fiche number, journal name or abbreviation, index terms, etc.) would

Figure 1



appear in full-size type across the top of each individual fiche. In addition to the microfiche, the packet could contain material printed in full-size type on paper cards, probably of the same size as the microfiche. This material could include the contents of the issue, an abstract of each article in the issue, and additional information of the sort commonly found in professional journals—announcements of meetings, calls for papers, etc. The value of the abstract cards may be enhanced by printing index terms at the top of each card; this would permit the user to build a card-file index to the microfiche. The publisher may wish to provide the subscriber with boxes in which to store the paper cards, the microfiche, or both. In addition, he might arrange with a vendor of microfiche viewers for a "tie-in" purchase, whereby the publisher would buy a number of readers at discount, and resell them to the journal's subscribers. This might result in some cost-reduction for the subscriber, and the publisher would be assured that the journal would be read through equipment of good quality; this could help to avoid dissatisfaction with the microform medium.

The microfiche journal could also differ from its macroform counterpart in ways that are less readily apparent. First, the articles in the microfiche journal could, on average, be much longer. This is primarily because of the relatively low cost of micropublishing: a black-and-white microfiche master, containing up to 96 pages of text, costs only a few dollars to prepare, and the distribution copies cost only a few cents apiece. The compactness of microform reinforces this (depending on the degree of reduction, each fiche may carry about 60 to 96 pages of text). Consequently, the publisher need not discourage, and may actually want to encourage, the submission of articles much longer than would normally be found in a journal.

The microform journal might also differ from its macroform equivalent in its use of color, again for economic reasons. Color microfiche costs about twice as much to prepare as black-and-white fiche (i.e., less than $30 per 60-frame fiche). Thus, it is much more economical to publish color in microform than in macroform. (The primary limitation here is that, to date, color microfiche has limited stability, so that its shelf-life is not as long as that of color on paper; after about five years, the color begins to fade.) Micropublishing, then, may be especially attractive in fields in which color is particularly important or advantageous.

The publisher may wish to issue an annual cumulation of his journal on roll or cartridge microfilm for institutional subscribers.

Benefits

The principal benefit of publishing a journal solely in microform is financial. Because the economics of micropublishing are much more attractive than those of conventional publishing, the microform-journal publisher has greater scope (in terms of article length and use of color) than the publisher of the conventional journal. Exploitation of this scope may result in a publication that is more satisfactory, in some ways, than a conventional journal.

Problems and Limitations

As we have said elsewhere, microfiche is less convenient to read than paper. It requires special equipment that is expensive, and, even under the best of circumstances, somewhat awkward. This definitely limits microform's appeal for readers, and should be expected to limit the circulation of a journal offered only on microfiche. Other physical problems include misplacement of the fiche and the limited shelf-life of color microfiche; these may be expected to result in some user dissatisfaction.

Applicability

The possibility of publishing exclusively in microform is likely to be especially interesting to an organization whose financial resources would not be adequate to support the publication of a conventional journal. Such an organization is likely to be small, and interested in publishing for a limited number of readers in a narrow subject area. These last two characteristics are probably important in themselves, however. Given the present state-of-the-art, it seems unlikely that a microform journal would achieve wide circulation, or experience much success, if it covered a broad topic that brought it into competition with print-on-paper journals.

These limitations may be offset, however, if the capability of publishing very long articles, or the extensive use of color, is very important. (If color is the sole consideration, the publisher may wish to develop a dual-publication scheme, in which material in color would be printed in microform, as a supplement to the printed journal; SEE: III.3–Supplemental Material on Microfiche.)

Management Considerations

A microfiche journal could be produced with a very small in-house staff. The publisher would not need any special equipment; microfilming and distribution could be done by a contractor. The only staff required would be an in-house managing editor and a typist to prepare the material that would appear on opaque cards.

On the other hand, because such a journal would represent a radical departure from convention, it would be especially important that its contents be of high intellectual quality and well presented. The publisher would be well advised to recruit a well-established, respected person to serve as executive editor, and to exercise great care in selecting associate editors and referees. Prestigious persons in these capacities might do much to help the journal's acceptance.

Presumably, the publisher would use author-prepared copy. In this case, he would have to prepare guidelines covering both editorial and physical requirements for authors' submissions (SEE: I.1.1–Author-Prepared Camera-Ready Copy). It might help to have authors first submit their papers in rough draft, so that the editor could make specific suggestions. If the journal were to accept material in color, the publisher would have to prepare special guidelines for color material. In any event, the editorial staff would have to be prepared to answer authors' questions and cope with their problems.

In promoting a microfiche journal, the publisher should be very careful to make sure that prospective subscribers understand exactly what a subscription to this journal would involve. Without adopting an unnecessarily negative tone, the publisher should make sure that his readers understand the requirement for special equipment, and that they realize exactly what the physical characteristics of the journal would be. If the promotion were by direct-mail campaign, the promotional leaflet might include line-drawing illustrations.

The publisher should be prepared to replace lost microfiche, answer subscribers' questions, and generally help readers to adjust to their non-conventional journal.

Sources of Additional Data

Harry W. Huizinga provides a great deal of useful information and informed commentary in his article, "Wildlife Disease–A 15-Year Microfiche Publication Experiment–Cons, Pros, Future?" This article appeared in the *Journal of Wildlife Diseases* Vol. 11(2), April 1975.

The reader will also find useful information in "Impact of Microfilms on Journal Costs," by Joseph H. Kuney; *IEEE Transactions on Professional Communication*, Vol. PC-16(3), September 1973.

For a librarian's point-of-view on this topic see:

"Surging Serial Costs: The Microfiche Solution," by Michael Gabriel; *Library Journal*, October 1, 1974.

MICROPUBLISHING FOR LOW-CIRCULATION PUBLICATIONS

Description

Scientific publishers–especially scientific societies and other non-profit publishers–find it necessary to publish, as a matter of obligation, some documents that are useful only for very small audiences. This type of publishing is of marginal financial viability, at best. Some publishers are beginning to turn to micropublishing for items of this sort, because it is far less expensive than print-on-paper publishing. The editor of one journal that publishes exclusively on microfiche figures his costs to be about one-quarter those of a comparable print-on-paper journal; another says his costs are about one-sixth what they would be if his journal were printed on paper.

Benefits

Micropublication of limited-distribution material permits the publisher to produce items of this sort without endangering his financial position. Important but unprofitable documents which otherwise would be unavailable can thus be published. Moreover, they can be published at affordable prices.

Problems and Limitations

The major problem is one that is endemic to all microform: inconvenience and reader resistance. Micropublication of very long documents, long translations, and other material of limited appeal is predicated on the idea that it is better to publish in microform, with all of that medium's drawbacks, than not to publish at all.

Applicability

This application of micropublishing would be appropriate for many different types of documents. They might include translations (especially long ones), very long documents, republications of works of historical interest, reference works, compilations of data, and many more.

Management Considerations

Before publishing something in microform, the publisher should try to make sure that there will be some demand for it, despite the medium. He should analyze the cost of the microfilming and distribution, and establish a price for the item that will give him a good chance to recover the cost of publication. In most cases, this will not be unattractive to readers.

Publications of this type may be effectively advertised in journals. If the publisher finds that he has developed a sizable library of these publications, he might find it worthwhile to prepare and advertise a catalog, listing and describing all of his micropublications. This catalog could be sent to libraries known to have holdings in the appropriate fields.

INFORMATION-DISSEMINATION ON AUDIO CASSETTE

Description

The use of audio tape as a medium for the regular dissemination of scientific information dates back to the early 1950's. Its development has been spurred by the development of the now-familiar tape cassette—which is much more convenient to handle than open-reel tape—and the mass production of relatively inexpensive, compact cassette players. By now, several "journals" are disseminated on audio cassette; most of them deal with some branch of chemistry or medicine.

The actual "package" of these journals, of course, contains more than a cassette. At regular intervals, the subscriber receives a certain number of cassettes, accompanied by printed material (paper sheets or cards) which describes the contents of the tape. At intervals, most of the journals disseminated in this form distribute printed indexes to the contents of their tapes. Several offer subscribers plastic units for storage of the cassettes, and cassette playback units, at moderate prices.

The content of these journals varies widely. Some are transcriptions of papers delivered at meetings, recorded either live or edited and re-recorded after initial delivery. Others summarize news in their fields of interest, highlighting and discussing current developments as they occur. Still others summarize, review, and comment on current literature in well-defined fields.

Many other materials disseminated on audio cassette are not periodic. These include lectures and interviews given by well-known authorities, and isolated coverage of special meetings and events.

Benefits

There are several advantages to audio dissemination of information. Certain types of communication—such as speeches, seminars, symposia, and other messages originally delivered orally—lend themselves better to dissemination in this medium than by the printed word. A certain amount of the impact, as well as the intelligibility, of meetings and lectures may be lost in the conversion to print. A lecture or interview given by an outstanding engineer or scientist has a historical interest that is enhanced by audio dissemination.

Audio dissemination of papers delivered at meetings, lectures, seminars, and colloquia can make information widely available earlier than would otherwise be the case. There is generally a long delay between research being reported in a meeting and its emergence into the formal literature through journal articles. Making more generally available the information imparted in these limited settings can act as a general stimulant to the movement and development of a field.

Another obvious advantage of this medium is that it can permit the conversion of what would otherwise be lost time to productive learning through listening. Many subscribers to audio journals report that they listen to their cassettes while driving or engaged in other activities which make reading impossible (there is no evidence that this has contributed to the occurrence of automobile accidents). Many subscribers find that this considerably increases the amount of time they can devote to keeping up with their fields.

Yet another advantage of audio dissemination is that a number of persons can use the same program source at the same time. Audio cassettes can thus be used very inexpensively by groups, both to impart information and to stimulate discussion.

Finally, listening is basically a more "painless" way of absorbing information than reading. Some kinds of material are easier to convey and to understand through spoken communication than through writing. Certain principles known to aid learning—such as frequent repetition—are more acceptable when applied to spoken communication than they would be in a printed journal article.

Problems and Limitations

Balancing the several advantages that we have mentioned are a number of limitations. First, dissemination in this medium does not, at least at present, constitute formal "publication." It cannot, therefore, be expected to serve one of the major functions of scientific journals—that of establishing a public record (no pun intended).

Second, although audio dissemination is better suited than print to certain kinds of material, there are many others which it cannot handle nearly as well as print-on-paper. It does not, for example, lend itself well to the communication of messages involving large masses or lists of data, precise quantitative information, mathematical expressions, and the like. It is ill-suited to the type of material that requires illustrations. (This shortcoming may be eradicated if the audio message is accompanied by printed illustrations.)

Third, dissemination on audio cassette is more expensive than printed publication. The user must have a tape recorder, which is likely to cost at least $50 to $80. The cassettes themselves are not inexpensive, either. Although the subscription prices for the journals in this medium vary widely, they work out to a price of approximately $3 to $6 per 60-minute tape. This price is really quite high, when we consider that spoken words on audio tape result in a very low-density store of information. A 60-minute cassette would contain far less information than the average journal issue.

Finally, this form if dissemination is slow to process. Auditory processing of verbal information is generally much slower than visual processing. That is, most of us can read much more rapidly than we assimilate material by hearing. ([illegible], the comparison is not precise. The limitation on the speed of audio dissemination of information is not so much the rate at which we can assimilate information aurally as it is the rate at which we speak. We can assimilate audible information more rapidly than most people speak, as experiments with compressed speech have demonstrated. The rate at which we can process this information, however, is extremely variable. For a number of reasons, compressed speech would not be a useful means of increasing the storage density and processing rate of the kind of verbal information we are discussing here.)

Applicability

The uses that have already been made of audio tape for disseminating scientific information illustrate rather well its applicability. It is well-suited to in-depth news coverage, meetings, lectures, reviews (both of literature and important topics or developments), and interviews. It seems particularly appropriate for extensive use in fields in which meetings are frequent and play important roles in communication.

This does not, of course, mean that it is inappropriate for fields in which meetings are held infrequently: an occasional tape, or irregular series, can be just as valuable as those that appear at frequent or regular intervals. The only difference is that in a field with fewer opportunities for recording, the possibility of developing a subscription service, or "periodical" on audio tape, would be unlikely.

Management Considerations

There are several problems that the manager must consider if he is to be successful at disseminating information on audio tape. There is far more involved in the satisfactory transcription of a paper delivered at a meeting than merely connecting a tape recorder to the microphone on the speaker's rostrum and having a secretary operate it. There are many problems, both editorial and mechanical, which make it unlikely that such an approach would work.

Most speeches or lectures need some editing before they are appropriate for wide dissemination. Often, the speaker is not the person best equipped to do this editing. Often, too, the message needs to be re-recorded, and the original speaker may not be the person best equipped to do this, either. The manager will therefore need the services of personnel qualified to edit, and perhaps to record, the material.

Unless they are specially arranged with recording in mind, conditions at a meeting or symposium may not be acoustically or mechanically suited to recording. Best results will be obtained if a qualified recording technician supervises or personally produces the recording. Again, it may be necessary to re-record the material under more favorable conditions. The equipment that this kind of recording calls for is of course much more expensive than that required for playback by users. For best results, the publisher should purchase or rent equipment especially for this purpose. Duplication of the master recording for dissemination on cassette should be done on contract by a recording company. The manager may be able to negotiate a substantial discount for the blank cassettes, either directly from a supplier or through the recording company.

Source of Additional Data

"The First Twenty Years of Audio-Digest (A Special Report)," by Claron L. Oakley; *California Medicine*, Vol. 16(6), June 1972.

INFORMATION-DISSEMINATION ON VIDEOTAPE

Description

Videotape, which was first developed and widely used for commercial television, has found increasing application in other fields. It has been particularly useful as a research and educational tool, permitting, as it does, on-the-spot recording and instant replay. It has been less used as a medium for the dissemination of scientific and technical information, although this seems to be changing.

The recording process involved in producing videotape is based on the same principles used in audio recording. The details, however, are quite different; the equipment is more complicated and expensive, and so is the tape.

Most scientific applications of videotape have been to the recording of meetings, lectures, and presentations, with stress placed on those in which visual communication has played an important role. One large society has videotaped a number of its meetings and colloquia, which it makes available on videocassettes to its chapters for playback at local meetings. Other organizations have videotaped lectures by outstanding authorities in their fields, again stressing topics in which the visual element is important.

Benefits

Video recordings of certain communications have a number of advantages. Several of these are similar to the advantages that audio recording has over the printed word (SEE: III.6–Information Dissemination on Audio Cassette). Video recording, of course, presents another major dimension, greatly enhancing both the impact of the communications and adding the capacity to transmit information that must be graphically presented.

These advantages would apply more or less equally to both videotape and film. Videotape, however, has several advantages over film for the kind of application we are considering. First, videotape requires no post-recording processing; it is immediately available for playback (instant replay). Second, videotape is re-usable; given proper handling, the same tape can be used many times. Third, videotape is generally less expensive than film, both because it requires no processing, and because the tape itself costs less than film. Fourth, videotape has some technical advantages over film. For example, in preparing black-and-white videotape, lighting is far less critical than it would be for filming; thus, videotape may be more appropriate for on-the-spot recording, as in meetings and other situations in which it is difficult to control the environment. (Color videotape, on the other hand, requires as much attention to lighting as does color film.)

Problems and Limitations

Offsetting the attractive features of videotape are a number of significant problem areas. First, it is expensive. The tape itself, although re-usable, can represent a major investment (a one-hour reel of half-inch tape of good quality costs about $20). A "set" of recording equipment for black-and-white videotape would cost close to $2,000; that required for color, close to $10,000. Moreover, the producer of videotape would need a studio or portable facility for editing and reproducing tape; this would cost at least $25,000. (Such facilities can be leased or rented as needed, but the cost of this, too, is generally high.) Special monitors are needed for the viewing of videotape. The price of these monitors has declined significantly in the last few years, but a good color monitor still costs about $800.

There are other disadvantages as well. Videotape is considerably more difficult to edit than film. It can be done, but it requires special skills and equipment. Additionally, videotape must be carefully stored and handled if its integrity is to be maintained. It cannot be exposed to high temperatures or magnetic fields without degrading or destroying the recording.

Applicability

Videotape may be an attractive medium of communication in several settings for organizations that can afford it. Because it is of the medium's essence that the message have some visual appeal or interest, it is logical to use videotape for meetings, lectures, and presentations, rather than the mere recitation of such text as is found in most journal articles.

Because of the great difference in cost, black-and-white videotape should be preferred in cases in which color is not essential. Where color is essential (as in medicine), videotape may be an especially useful medium for information-dissemination, particularly in training situations.

One application of videotape that might be especially interesting to scientific societies and publishers is not directly concerned with the primary dissemination of scientific information, but rather with the matter of historical documentation. The scientific publisher might arrange for the videotaping of special lectures by outstanding authorities discussing their work, developments they foresee, the changes they have seen, and other matters of general interest. Such lectures could become an important historical resource. They might also be sold or rented by the publisher to educational institutions, local chapters of societies, and other organizations interested in each expert's field.

Management Considerations

The manager considering the dissemination of information on videotape should first consider whether the need (demand) exists for such recording. If he decides that it does, he should begin to educate himself concerning the processes, costs, and procedures that would be involved. To do this, he should seek the advice of somebody skilled in working with videotape. A good place to begin would be in the department or school of education (or communications, if there is one) of a nearby college or university.

If he is planning to videotape a scheduled conference or meeting, he should be sure to integrate the videotaping plans with those for the conference. He should realize that the tapes will have to be edited because of the great amount of "dead" time in an event of this type. He must also consider whether to purchase, rent, or contract for this videotaping and editing. In most cases, a gradual entry into the process will be more satisfactory than a large initial investment in equipment and facilities, even if the manager is sure that he wishes to establish an extensive, active videotaping program. If the videotaping applications are to be few and infrequent, it will be better to rent equipment or have the work done on contract.

Because of the large capital investment required to obtain all of the equipment and facilities needed to operate a videotaping program, the publisher may wish to investigate the possibility of founding a consortium with other scientific publishers, to establish and operate a videotaping-service facility that all might use.

Source of Additional Data

"Videotape Theater–Exciting Vehicle for Reporting Research," by A. Stanley Higgins; *Technical Communication*, Second Quarter 1975.

COMPUTER NETWORK FOR PERSON-TO-PERSON COMMUNICATION

Description

On-line computer networks have generally been used to permit a number of persons in different locations to interact with a data-processing system. Several organizations that have such networks, however, have learned that with some modest systems development they can also be used for interpersonal communication.

The person who wishes to send a message signs on the computer through a keyboard terminal, and activates the communication system. He enters the name(s) of the person(s) to whom he wishes to direct his message. He enters his message (which the computer automatically dates, times, numbers, and identifies by its source). Another user, in any location served by the network, signs on and asks whether messages are waiting for him. If there are, the computer notifies him and plays out the message(s). The only person who can purge a message from the system is the originator, so messages cannot be accidentally destroyed.

When a user signs on, the system automatically tells him whether the messages he has entered have been received by all of the proper recipients, and whether messages are waiting for him. The sender can designate recipients by name or by general destination (laboratory, institution, study team, office, etc.). The privacy of messages is protected, since each user has a unique identifier which he enters when he signs onto the system; even though a message has been directed to a user by name, it cannot be printed out unless the recipient has entered his personal identification code.

Benefits

This type of communication can be more economical than long-distance telephone. We assume that only a network already in existence for other purposes would be used in the way described. If there is such a network, though, use of it for this purpose can be inexpensive. The processing involves little computer time, and because each user is connected to a computer facility by local telephone lines, long-distance charges are avoided.

There are other advantages, too. Because each communication results in a record, it is more formal and carries more weight than a telephone call. Moreover, the record can be filed to help avoid confusion and misunderstanding. Communication of this type is particularly attractive when one wishes to send a message to a number of people, since distribution and repetition of the message is automatic. The sender need not worry about whether the recipient is ready to receive his message; he can send his message at any time, and know that it will arrive. Finally, the system helps to guarantee receipt of the message, by notifying the sender whether messages he has input have been received.

Problems and Limitations

There are two principal limitations to this type of system. First, it is best suited to relatively short messages. Because each message must be entered through a keyboard terminal, creation of the message is much slower than voice communication. Second, the system is not really satisfactory for interactive communication, for the same reason. To carry out a conversation with another person through this system would be extremely awkward and time-consuming.

Applicability

As we have mentioned, this type of system is appropriate *only* where an on-line computer network already exists. There must also be a substantial need for communication between the various locations in the network. If there are many locations and they are widely scattered, the sponsor may find that developing a system of this type will result in considerable savings in long-distance telephone charges.

Management Considerations

The manager of an organization with the type of network required to develop this system should consult a data-processing specialist about how best to proceed. He must bear in mind that the system, to be successful, must be very simple to use. It must compete with the ease of long-distance telephone communication. It will probably be used primarily by people who are not computer specialists; therefore, the system must include effective error-correction and tutorial capabilities.

Source of Additional Data

"The Case for Electronic Mail," by Mortimer Rogoff; *Modern Data*, December 1974.

INFORMATION-DISSEMINATION ON COMPUTER-READABLE MAGNETIC TAPE

Description

Computer tape is widely used as a storage medium and source of input for computer-readable material. Several organizations now use it as a medium for disseminating material that will be processed by computer. The tapes are usually accompanied by printed manuals or leaflets describing the tapes' contents, uses, and requirements for computer processing.

Benefits

Dissemination of information and data in computer-readable form is desirable for certain types of material (see below). In such cases, magnetic tape is now the medium of choice (machine-readable microform would be preferable in some ways, but has not yet been developed enough to supplant magnetic media). The tape represents an acceptable compromise in terms of cost, physical convenience, compactness, and resistance to mishap. Information and data that require computer processing, or that will be extensively used for this purpose, can be disseminated on tape, saving the recipient the necessity of translating the material to another medium.

Problems and Limitations

The major problem with this kind of dissemination is that the tape and the system used to produce it must be compatible with the user's data-processing environment (hardware and software). Problems arising from incompatibility can be minimized by describing fully the tape's contents and format, and specifying its processing requirements when the tape's availability is announced.

Applicability

Computer-readable tape may be a suitable means of disseminating two kinds of material: textual information or quantitative data that users will want to process by computer, and programs that users may use in processing certain kinds of information or data. The former category includes such things as cumulations of numerical or statistical data, or textual information to be entered into machine-searchable data bases. The second category includes such items as photocomposition programs, statistical processing packages, and programs for the analysis of experimental or survey data.

Management Considerations

The manager who has a machine-readable file that he thinks could interest or benefit others in his field should have a data-processing specialist prepare a description of the tapes' contents and format, so that potential users can determine whether their data-processing facilities can accept these tapes. In this description, he should include the computer language with which the tape was produced, and specify the type of compiler that the user will need. He should identify the computer that generated the tape and specify the processing configuration that the user will need.

He may promote awareness of the tape(s) in any of several ways: by advertising in journals, letters to journals, announcements at meetings, or mailings to selected audiences. To make it accessible to more users, he may find it worthwhile to offer the tape in several common formats.

PHONOGRAPH RECORD BOUND INTO JOURNAL

Description

In some fields, sonic information is essential to the effective communication of certain messages. Where this is so, the author of a journal article may want to supplement the printed text of his paper with a phonograph recording. This recording can be pressed on thin sheets of vinyl, which can then be bound into the journal. The reader can detach the record and play it on any phonograph. (Most of us have seen this type of recording in record companies' promotional campaigns.)

Benefits

This technique may make available information that could not be effectively conveyed through text alone, and at a cost lower than that of audio tape.

Problems and Limitations

Although this type of recording can be made with reasonably good fidelity, it is easily damaged and has a very short life span. It is not suited for archival retention, and so should not be used if the author intends that readers should be able to use the recording for a long time.

The storage capacity of this type of recording (even recorded at 33 1/3 rpm) is quite limited. Its capacity, of course, is a function of its diameter, which will presumably be somewhat smaller than the width of the journal into which the recording is bound. Assuming that the journal is in an 8 1/2" x 11" format, the recording would have a diameter of about 7 inches, making its playing time about ten minutes.

Applicability

The need for this kind of dissemination is rare. When it occurs, however, sound can be an invaluable adjunct to printed text. One area of possible application is medicine, in which the sounds of certain pathological conditions are important symptoms; a recording of them may be much more helpful than a description. This type of recording has also been used in the geosciences; the sounds of different kinds of earthquakes have been recorded to supplement a journal article.

As an alternative to this type of dissemination, a journal article that needs sound to convey fully its message could contain an announcement directing interested readers to contact the author for tape recordings. This would result in recordings being sent only to persons who specifically ask for them, in a medium much better suited to long-term storage and use.

Management Considerations

Authors who need this kind of adjunct to the printed text of their articles will generally request it, if they know that it is available. The editor may decide that recordings would enhance some articles, and suggest them to the authors.

Generally speaking, the author will have to pay for this addition to the journal; few journals could afford the expense. The size of the journal's circulation will probably be a major factor in the author's decision to supplement his article with a recording.

DUAL-POLARITY MICROFICHE

Description

The polarity of microfiche images has an important effect on their utility. Unfortunately, different polarities are desirable for different applications. For reading general text with a microform reader or viewer, a negative image (clear lines on a dark background) is usually preferable. The dark background reduces screen glare, producing less eye fatigue. Negative images do not show scratches on the film as readily as positive images (dark lines on a clear background), so the intrusive appearance of wear is reduced. Blow-back (full-size) paper prints can be made more conveniently from negative images. (A positive-polarity blow-back is almost always desired, but the process whereby most blow-backs are made reverses polarity, so that to get a positive blow-back, one must start with a negative-polarity microfiche. Some new reader/printers which use electrostatic printing processes can produce positive prints from either negative or positive images. This is called bi-polar printing. These reader/printers are not yet in widespread use.)

For texts with photographic materials, a positive image is preferable, because it is more readily understood. Moreover, some people prefer to read all material in positive polarity. With conventional equipment, however, positive microfiche results in a negative-polarity blow-back, so that the photograph that is in the desirable polarity for reading will be unsatisfactory in blow-back.

In some special applications, microfiche has been produced in both polarities. One-half of each fiche is in negative polarity, the other in positive.

Benefits

Preparing microfiche in both polarities permits viewing in whichever polarity the reader prefers (or the material requires), with positive blow-back of all material on the fiche.

Problems and Limitations

The most obvious drawback to this method of producing microfiche is that it uses space inefficiently. If all material on a microfiche is presented in each polarity, it will occupy twice as much space as it would if a single polarity were used. Thus, dual-polarity micropublishing is more expensive, because it results in more microfiche. The extra processing adds further to the cost.

Applicability

Dual-polarity microfiche, as we have suggested, is most appropriate for materials that include photographic images.

Management Considerations

The publisher who produces dual-polarity microfiche should be sure that it is accompanied by material explaining the dual format, the reason for it, and how to use it.

VERTICAL FORMAT FOR MICROFICHE

Description

In most conventional use of microfiche, particularly for textual material, the contents are arranged in a number of frames that run from left to right across the fiche, starting in the upper left-hand corner (see Figure 1). Each frame is one page-image, and represents one page of full-size text. This format seems natural, because it corresponds closely to the way we read the pages of a journal or book. Other formats, however, are possible, and may even be better, since they can exploit some of the differences between microform and full-size hard-copy. For example, training material has been successfully prepared by placing the essential material in the middle row, with supplemental material in the rows above and below it (see Figure 2). With this format, the reader starts with the material in the middle; if he has difficulty understanding it, he moves upward or downward, to find additional information that may help him. This treatment of the microfiche as a grid could not be duplicated with a book.

FIG. 1 - CONVENTIONAL FORMAT

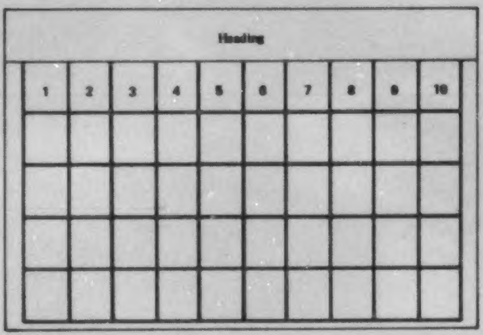


FIG. 2 - FORMAT FOR TRAINING MATERIALS

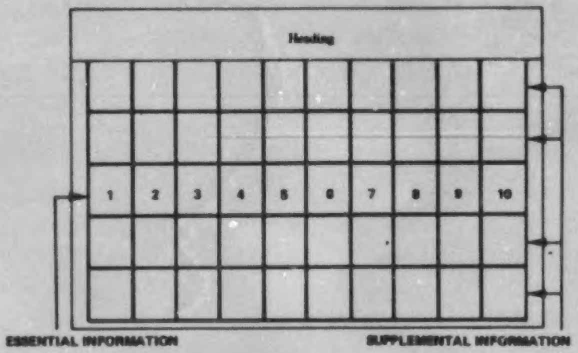
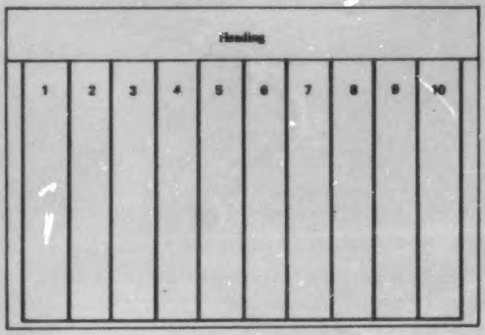


FIG. 3 - VERTICAL FORMAT



Another non-conventional format might be useful for the type of textual information found in journal articles, monographs, and books. When we read a conventional journal, we start in the upper left-hand part of the page, then read left-to-right and downward until we come to the bottom of the page; we then turn the page and begin the process again. Turning the page interrupts our reading, but it is dictated by the medium. With microform, however, the "page" can be enormously expanded. If one were to take advantage of this, the format would be something like that shown in Figure 3. The text and illustrations would run in long continuous columns starting in the upper left-hand portion of the fiche, and proceeding to the right. At the top of each column would appear a list of the column's contents.

Benefits

This arrangement of material on microfiche would make reading much easier and more efficient. One could read the equivalent of several full-size pages without moving one's eyes from the center of the column. The reader would advance the fiche steadily and gradually, instead of shifting abruptly to new page-images. Reading without the frequent interruptions of page-breaks should improve comprehension and be less distracting.

The format has another advantage. By arranging material in a continuous stream, rather than in broken-up page-images, the publisher would make much more efficient use of the microfiche. "White space" appears at the beginning and end of every page in a book; in the conventional microfiche format, this is reproduced on the microfiche, wasting space. Moreover, marginal white space is also reproduced, and the consumption of space on each fiche is further increased by the necessity of leaving room between page-image frames. In the format shown in Figure 3, this is reduced. The result would be that considerably more material could be put on each fiche than is possible using the conventional arrangement.

Problems and Limitations

The principal drawback to this format is that the material on a fiche could not be indexed and accessed by the system employed with the conventional format (in which items are located by frame number). This drawback would be partially offset by the list (at the top of each column) that describes the column's contents.

Applicability

This format could be used with many different kinds of material. It would be useful for both textual material (as in articles or monographs) and in lists or directories. If the contents of the microfiche were journal articles, and more than one article were to be placed on a slip of fiche, each article could be made to begin at the top of a column. This would admittedly result in some unused space, wherever an article did not fill up a column; the more efficient utilization of space within columns, however, should make this acceptable, if the articles were not very short.

Management Considerations

The editor or publisher who wishes to try this format should experiment with it, to ensure that his microform contractor (or printer, if the printer does the microfilming) can produce the format successfully. If the result is satisfactory, the publisher should simply announce the new format to his microfiche customers, and explain how it is to be used.

Sources of Additional Data

In the early 1970's James P. Kottenstette and K. Anne Dailey of the Denver Research Institute, University of Denver, performed a study for the Air Force Human Resources Laboratory, Lowry Air Force Base, Colorado, dealing in part with the effects of various microfiche formats on reading speed and comprehensibility. The results of this study have been published in a series of reports coded AFHRL-TR-71. Two of the reports in this series directly pertain to the topic in question:

Experimentation in Microfiche Formatting and *Innovative Formats for Training Materials.*

FACSIMILE TELECONFERENCING

Description

Equipment and systems are now commercially available that permit one to converse by telephone and simultaneously write or draw. The graphic communication uses a pressure-sensitive pad connected to a telefacsimile device; voice communication uses the same telephone line. The equipment can be used for two-way communication between two points, simultaneous communication from one point to many others, or conference communication among a number of points. The graphic unit can receive messages while unattended. It can also be used with an overhead projector, so that a group of persons can use a receiving station at the same time.

Benefits

This technology permits the intermixing of graphic and vocal communication, so that complicated messages can be transmitted more quickly and intelligibly than would be possible if only one mode were used. Moreover, it produces a record that can be filed and used to confirm the communication. Its flexibility in accommodating both individual and group communication permits its adaptation to a variety of situations.

Problems and Limitations

This type of communication requires special equipment for all stations. As of this writing, details concerning the equipment's cost are not available. We assume, though, that the cost could not be much lower than that of regular telefacsimile (at least $1,000 per station for transceivers); the equipment would have to be used quite actively for this investment to be justified.

Another limitation is that the transmission of graphic material is considerably slower than voice communication; if a single message needed to include a number of graphics, this might present problems.

Applicability

At present, the applicability of this type of technology to scientific communication is rather limited. (It has been used most frequently in hospitals, dispatching systems, production-control systems, and ordering systems.) It is appropriate for situations in which rapid person-to-person communication is necessary, and in which graphic communication or a written record is important. In science, this is probably limited to the transmission of certain research information. It might also be useful for certain types of engineering information.

Management Considerations

The manager who is interested in learning more about this type of communication should be most concerned that its use is really justified. The equipment itself is compact, easy to install, and portable, so there are no major technical problems associated with it.

DISSEMINATION FROM A CENTRAL MICROFICHE DEPOSITORY

Description

This description is based on a depository that actually exists. Our purpose, however, is not to describe the existing depository, but to present the concept on which it is based. Other depositories of this same basic type may also be in operation, differing in specific detail from the model we describe here. The important thing, however, is the underlying concept.

The depository serves all areas of science, without restriction. Its basic medium of storage is microfiche; it can provide a user with any document in the depository on microfiche or hard-copy (paper photocopy).

Anyone may submit material to the depository. Submissions come from authors, editors, and publishers. Submitted documents need not have been published; in fact, many of the depository's contents have never been formally published. The works deposited may be of any sort or length; typical submissions include tables, photographs, graphs and charts, computer printouts, bibliographies, journal articles, monographs, and back issues of journals.

The depositor is charged a fixed, nominal fee (less than $20), which he must pay when he makes his submission. The depository assigns an accession number to the deposit, microfilms it, and returns the original to the person who submitted it, along with several *gratis* microfiche copies. The depository keeps the microfiche masters in a file which it can search in only two ways: by accession number, and by principal author.

A reader could learn of the existence of material in the depository in any of several ways. If the depositor is the publisher of a journal, the journal would presumably carry a notice instructing readers to order copies of back issues from the depository. If the depositor were an author, he could directly refer persons interested in his work to be depository.

The reader would contact the depository, requesting a document by its accession number or the primary author's name. In placing his order, he would specify whether he wished the document on microfiche or in photocopy. The price for the microfiche copy is very nominal (less than $2 for each 96-frame fiche); the price for photocopy would be considerably higher (about 15¢ per page, or roughly ten times the price of one page-image on microfiche). The depository guarantees a 24-hour response to users' orders.

Benefits

This type of depository makes information permanently available to anyone who may need it, with minimal waiting, and at modest cost. It frees the publisher and author of responsibility for maintaining copies of published works. It also makes publicly available copies of works that have not been formally published.

Problems and Limitations

A major difficulty with this type of depository is that documents, although available, may become lost in it. Because of the scope of the operation, and the importance of keeping down the price of documents to be supplied from the depository, it is difficult for the depository to take responsibility for making potential users aware of the documents it contains. Thus, it tends to function passively. This is all very well in the case of documents whose authors or publishers promote awareness of them, but it relegates many other documents to a kind of limbo.

This problem is aggravated by the lack of any indexing scheme or search-and-retrieval capability for the collection. The ideal depository would have such a capability, so that documents in the depository would not have to be brought to users' attention through other agencies.

Applicability

Use of the type of depository we have described seems particularly appropriate for two kinds of documents. The first would be those whose informational content is likely to have a very long "half-life." With documents of this type, permanent availability is important. The other candidates would be documents whose authors or publishers cannot afford, or do not wish, to take responsibility for making them available over long periods of time.

Management Considerations

The publications manager who commits himself to use of this sort of depository should realize that, in doing so, he loses whatever potential the deposited documents may have for generating income through sale as separates.

Source of Additional Data

"Remote Transmission and Automated Retrieval Techniques," by Dr. R. Barrett; In *New Developments in Storage, Retrieval and Dissemination of Aerospace Information* (AGARD Conference Proceedings No. 136–Papers presented at the 26th Meeting of the AGARD Technical Information Panel, London, October 2-3, 1973). North Atlantic Treaty Organization, Advisory Group for Aerospace Research and Development, Neuilly Sur Seine, FRANCE.

SECTION IV

TRENDS AND PROSPECTS

The preceding sections of the Guide have been concerned with innovation possibilities which are practical and within the current state-of-the-art. This section of the Guide deals with a number of possibilities for innovation which have not yet reached this point, but which are clearly on the horizon and are in an active state of development.

The reader is encouraged to review these possibilities in order to develop an appreciation of what to expect in the near future, and to anticipate particular developments that may soon be applicable to scientific communication.

NOVEL MICROFICHE SYSTEM

An unorthodox microfiche system has recently been developed and produced in prototype form. The lens system is embedded in the microfiche itself, rather than being contained in the reader. One side of the microfiche contains the information, with portions of the copy dispersed or scattered out of its ordinary sequence to prevent unauthorized duplication. The other side has the magnification required, in the form of embossed "lensettes," which are carefully located in a matrix that reconstructs, illuminates, and magnifies the contents of the microfiche. The special microfiche used in this system is made from stock somewhat thicker—7 mils—than customary microfiche. The light source is a small 12-volt lamp, powered by ordinary flashlight cells, a rechargeable battery, or a small transformer that plugs into ordinary house current. The cost of production is slightly higher than for ordinary microfiche.

The reader consists of a screen, mask plate, light source, and transport system. It needs no lens system, since that is embedded in the fiche itself. This permits the reader to be very thin; one of the prototype models is hardly larger than a standard page, only an inch thick, and weighs less than one pound. Production of readers in various sizes, so as to correspond with specific user needs, is now being contemplated.

Reduction ratios for the microfiche will vary according to the particular mode of reader used. Both the reader and the microfiche have been patented in many countries. The first production models to be field tested are expected sometime in 1976. No literature describing the reader, the microfiche, or the unique process employed is available.

UNIVERSAL OCR SCANNING EQUIPMENT

One of the major impediments to the development and acceptance of optical character recognition (OCR) has been the limited "repertoire" of the recognition equipment: most optical scanners can accept input only if it adheres scrupulously to specified formats, and uses a type style designed expressly for OCR. Much of the equipment now on the market can read more than one of the special OCR type styles, and some scanners can read some styles that were not designed for OCR (although they generally scan these less accurately than they do the OCR styles). Until very recently, however, the ideal of a "universal" OCR scanner seemed a distant goal.

Within the last year, at least two systems have become operational which very nearly approach this goal. These systems are expensive; they range in price from over $350,000 to $1.5 million. They can be made, according to the manufacturers, to convert almost any kind of input, including hand-printed letters, into computer-readable form. Both of these systems are currently being used in major document-processing applications for the U.S. Government. Both manufacturers are reportedly working on less expensive versions of their systems, which could be presented to a more general market.

COMPUTERIZED PRINTING, BINDING, AND MAILING

Computers and related electronic processing equipment have already found their way into printing and binding operations. Computer-controlled sensors are now being used to detect and correct faults in paper and processing operations. The result is that machine downtime is decreased, and productivity rises. High-speed equipment thus becomes more efficient and practical (without these automated control systems, high-speed equipment spends inordinate amounts of time out of operation, while errors are being laboriously hand-corrected). Another new concept in computer technology applied to printing and binding is "on-line maintenance-analysis." In this, the computer periodically and automatically monitors sensors in various parts of the processing mechanisms to ensure that they are operating properly. Components not passing the tests are immediately identified, so that they can be repaired *before* they cause problems.

Hardware has already been developed which makes it possible to automatically track individual books throughout the binding process. With this equipment, and with computer control of printing and binding, it will soon be possible to assemble documents selectively, on an individual or group basis. The system will also automatically package the documents as they emerge from a binding line, and print and affix mailing labels from a computer store. The system will automatically sense and replace defective documents. Thus, the entire printing, binding, packaging, labeling, and mailing process will be automatic, and can be made selective, to result in books or magazines tailored to particular groups or persons.

Sources of Additional Data

A number of very interesting developments concerning printing and binding are described in the following articles:

The Impact of Electronics on the Bindary, by Dr. Dale H. Jackson; a paper presented at Inter Tech '74, International Conference on Graphic Communications Technology, sponsored by the Graphic Arts Technical Foundation, Pittsburgh, PA. November 20-22, 1974.

"Pace Quickens in Computerized Bindary," by John Newsome; *Printing Management & Printing Magazine*, November 1973.

"Bindary Bids for Super Automation," by Eugene F. Sitterley; *Printing Management & Printing Magazine*, November 1973.

"The Amazing Book Machine," by Thomas H. Hicks; *21st Proceedings of the Society for Technical Communication*, May 1974.

COMPUTER NETWORKS FOR MARKETING

Within the next few years, computer networks can be expected to work major changes in the marketing of publications. With the cost of developing and operating computer networks declining, we can expect to see networks used in two ways that will profoundly affect the marketing and delivery of publications of all sorts. First, computer networks can be used to accept orders from distribution centers and control delivery of documents, so that publishers will be able to make production closely match actual demand (rather than producing and distributing documents based on anticipated demand). Second, computer networks can be used to target marketing messages to very carefully selected recipients, and to obtain an immediate response from those recipients. Both of these developments will bring us much closer to the ideal of total demand publishing, wherein the publisher does not have to estimate the size of his audience, but produces in answer to actual expressions of interest.

TELEVISION TRANSMISSION OF SPECIAL-PURPOSE INFORMATION

Several television systems are now available, both in this country and abroad, which use conventional television receivers to provide access to special information. All of the applications so far have involved news-related information: straight news, stock-market quotations, racing news, and other kinds of information for which currency is very important.

These systems work by adding special, relatively inexpensive, equipment to a normal television receiver. One device enables the set to receive a special signal, which may be sent by cable TV, or broadcast in the "gaps" between the picture-images of normal transmission. A second device permits the user to locate a particular item that interests him. For example, if the special transmission is the equivalent of a newspaper, it will have several "page-images"; by using the selector, the user can receive any one of those images (all of the images are being broadcast simultaneously, and, hence, are available to persons using the system). The third device is a special facsimile receiver, with which the user can obtain a printed copy of the image on his television screen.

To date, these systems have not been used to disseminate scientific information. There is, however, no technical reason to prevent their application to this material.

Source of Additional Data

Dennis Flanagan, editor of *Scientific American*, presents some interesting speculation on the coming trends in scientific communication in "The Future of Scientific Communication," *Federation Proceedings*, Vol. 33(6), June 1974.

DIGITAL RECORDING

A new recording system has been developed and produced in prototype, which optically records micron-sized digital codes (dots and spaces). The system produces an ultradense storage on a very inexpensive record. According to the developers, the system is well suited to a wide variety of applications, including information storage and retrieval systems, home and professional TV, home and professional audio devices, and education and games. The system is capable of recording any kind of information that can be converted to digital code, so it can be applied to audio, visual, audio-visual, and machine-readable records.

According to the developers, the records and playback equipment would be very inexpensive, if produced in quantity. The fidelity of reproduction would be very high, and there would be no record wear in using the system.

The applicability of such a system to scientific communication would be very wide. Records for this system might be used both in the original dissemination of information and in storage and retrieval systems.

VOICE INPUT TO DATA BASE

Several voice-recognition systems have been developed which permit the input of spoken words directly into a computer. In some of these, the computer must be "trained" to recognize the speaker; in others, the speaker must be trained to the computer system. At least one system has been developed in which the computer will recognize words spoken by a wide range of voices, speaking with different accents and inflections. Even so, such a system has definite limitations. Its vocabulary is necessarily small (at present, about one thousand words), and the speaker must pause after each word and wait for the computer to respond (either repeating the word for verification, or asking the speaker to repeat).

Although this technology is still limited, it unquestionably works. Over the next few years, we should see it progressively refined, along with other technologies which simplify the task of entering information into a computer.

"SCRAMBLING" OF VIDEO CASSETTES TO PREVENT UNAUTHORIZED DUPLICATION

A system has recently been developed to hamper the unauthorized duplication of video cassettes. It involves the insertion of a special device between the playback of a master and the recording of the authorized duplicate cassettes. This device encodes special engineering data into the authorized cassettes; to duplicate the cassettes, the engineering data must be decoded. The system is not foolproof; a sophisticated engineer could decode the engineering data. The developers of the process say, though, that most unauthorized duplication is done by novices who do not know that they are violating copyright, and whose engineering skills are not sophisticated enough to permit them to unscramble the special data.

The developers of this system feel that it should encourage the production and distribution of material on video cassette. They maintain that one barrier to the development of a large-scale video industry has been the fear among educational libraries that the cassettes they distribute would be unlawfully copied, making it difficult or impossible for them to recover the costs of their operations. With the ability to "scramble" their materials, more organizations should be encouraged to use the medium.

DIRECT INPUT TO COMPUTER DATA BASE

A trend is currently in progress to make it simpler, less expensive, and easier to input information and data into computer systems. The use of optical character recognition (OCR), word-processor tapes, and voice input to data bases all exemplify this trend. Other mechanisms for direct entry are light pens (used with CRT terminals), analog sensors for "hand-written" input, and on-line input from keyboard terminals. The last of these is particularly pertinent to publishing operations; in some systems, it is superseding the more traditional punched cards and paper tape as primary means of input to text-editing and photocomposition systems.

Portable terminals have been available for several years, making it possible for users to access a data base from virtually any location with a telephone. The most recent development along this line is the introduction, in late 1974, of a portable editing (i.e., CRT) terminal no larger than a briefcase. With such a terminal, one can enter copy into a text-editing system from any telephone, and edit the copy on-line. A newspaper reporter, for example, might use such a terminal to file a report into a text-processing system, edit the story on-line to the computer, and enter a code that would tell the computer to display the story for a copy editor. Of course, the same system could be used for other kinds of text-processing.

PAGE TRANSMISSION TO PRINTING PLATE BY LASER

A project is underway to develop a laser-oriented system that can scan and digitize page proofs or paste-ups, and remotely record the images directly onto printing plates. The purpose of the system would be to link a centrally located laser scanner with recorders at distant sites, and to eliminate the photographic processes now required to produce printing plates. Although the immediate application of the system is expected to be to the facsimile transmission of newspaper pages, it has potential applicability to many other kinds of publishing as well.

MICRO-FACSIMILE

Conventional facsimile transmission cannot provide enough resolution to make it compatible with microform. A new telefacsimile system has been developed which, according to its originators, is faster and less expensive than conventional systems, and provides enough resolution to make it capable of transmitting microform images. The system is based on new electronic and optical (rather than mechanical) techniques for scanning, processing, and reception. The developers say that this new system will be applied to the transmission of micro-images through normal telephone lines.

SECTION V

INNOVATIONS NEEDED

Advancement in some areas of scientific communication is clearly impeded by the lack of effective approaches and solutions to basic problems. This section of the Guide describes some "problems" which clearly call for "solution."

Some of these needs may have simple, straightforward solutions; others will require extensive time and effort before practical solutions are forthcoming.

These areas of need have been included in this Guide in the hope that readers who know of applicable solutions or innovations will advise us of them. We hope, too, that readers who can identify other areas in need of innovative improvements will suggest them to us.

INEXPENSIVE, HIGH-QUALITY, CONVENIENT MICROFORM READER

The main barrier to the widespread acceptance of microform (especially microfiche) as a medium for the primary dissemination of information, rather than archival use, is that it cannot yet compete with the convenience of print-on-paper publications. Some limitations are inherent in the medium itself. One cannot, for instance, make marginal notes on a slip of microfiche. Limitations of this type, though, could probably be tolerated if there were available an affordable, high-quality, truly portable and convenient microform reader. Despite improvements in readers over the last several years, such a device does not now exist.

To compete with print-on-paper, the reader would have to be comparable in most ways to a conventional document–a journal or book. It would have to be small enough to be conveniently portable–that is, it would have to fit easily into a pocket or briefcase. It would have to contain its own power supply. The viewing area would have to display the image of an entire page of text in a size that one could read for long periods of time. Eye position must not be critical (as it is in the small viewers that are available now). Image contrast and brightness would have to be great enough to permit reading without regard to ambient light, yet not induce eye strain or fatigue. Finally, the price of such a reader would have to be low enough to put it within comfortable reach of a majority of working scientists–probably less than $50.

Such a reader does not now exist, despite some manufacturers' claims. To be sure, there are available small hand-held readers, including some inexpensive ones. Invariably, they lack one or another of the important characteristics that we have mentioned. Some of them are adequate for "look-up" or reference applications, although their cost generally exceeds what we consider the "threshold of affordability." None of them can be comfortably or conveniently used for reading lengthy, textual material.

MICROFILMING APPARATUS FOR SMALL-VOLUME APPLICATIONS

Most microfilming appartus that we know of has been geared toward large-volume applications. This is natural and logical, since the original impetus to use microfilm was the need to convert large collections of records and documents to more compact form.

The micrographics industry has tended to overlook another possible type of application. In almost any office, there are some materials that would be logical candidates for conversion to microform. With present equipment and processing methods, however, the expense and, even more, the inconvenience of this conversion is usually prohibitive.

A logical way to deal with this would be to develop apparatus for microfilming that would be both compact and inexpensive. This equipment should be designed for processing *small* numbers of documents, rather than large ones. It should be so simple to operate that the scientist or businessman could process his own document collection, without outside help, when and as he wished. With this kind of control over the processing, and assuming an attractive price for the equipment, we believe that the use of microform in small offices and for personal document collections would increase greatly.

HIGH-OPACITY, INEXPENSIVE, LIGHTWEIGHT PAPER

This innovation is self-explanatory. The need is great. The cost of paper has risen drastically in the last few years, driving up the cost of publishing. Even were the price of paper to come down, it would be desirable to have lighter-weight, more opaque papers than are now available, to make documents more compact and less expensive to distribute.

AMERICAN SIMPLIFIED KEYBOARD FOR WORD-PROCESSING EQUIPMENT

Christopher L. Sholes invented the modern typewriter in 1867. For it, he developed a keyboard in which letters were intentionally located in such a way as to *decrease* typing speed. He did this because the machine was slow and jammed easily; by scrambling the alphabet, he minimized the chance that typists might "outpace" the machine. This scrambled keyboard became, and has remained, standard–even though the reason for its design has disappeared, and despite the fact that its design limits a typist's efficiency. It seems ironic that this should be so, particularly in view of all of the improvements that have been made to the typewriter to increase its efficiency.

In 1932, August Dvorak designed the first simplified typewriter keyboard, based on scientific principles. His design re-arranged the alphabet to reduce training time, increase typing speed, and reduce fatigue and errors. This keyboard, called the Dvorak Keyboard or the American Simplified Keyboard (ASK), has been marketed unsuccessfully over the years by several manufacturers. It is now being manufactured by Smith-Corona; it is available, at additional cost, on certain SCM typewriters.

The ASK arranges the alphabet so that all of the vowels and the most frequently used consonants are on the keys of the "home row." This results in 70% of all typing being done of the home row, as opposed to 30% on a standard keyboard. According to Smith-Corona, this permits a typist to do almost 80% more work on the ASK than on a conventional keyboard, with less fatigue and fewer errors.

The advantages of the ASK are greater with an electric typewriter than with a manual one, since the electric is inherently capable of greater speed. We would like to see the ASK made available on word-processing equipment, for similar reasons. Since the ASK increases a typist's efficiency, it should decrease the time required to record material on a word-processor. Thus, more of the machine's time could be used for editing and playback.

There are two major objections to this. First, manufacturers of word-processing equipment would have to modify their designs. The second reason–and this seems to be why the ASK, although superior to the standard keyboard, has never caught on–is that typists would have to re-train. It seems to us that the significantly greater efficiency of the ASK would justify the expense and the inconvenience of these changes.

To deal with the potentially thorny problem of mass re-training of typists, we suggest that Smith-Corona, or anyone else interested in promoting acceptance of the ASK, conduct research to determine:

- How long, on the average, re-training should take;
- How difficult re-training is;
- How long it should take to extinguish old typing habits (how long would typists make errors based on incomplete conversion to the ASK?);
- How long it should take to realize the efficiencies of the ASK;
- The range of typing speeds that should be achievable with the ASK;

The results of this research should then be used in marketing the ASK.

IMPROVED INTERFACE BETWEEN WORD-PROCESSORS AND PHOTOCOMPOSITION

Word-processing equipment should have considerable potential for preparing input to photocomposition systems. Word-processors are basically editing devices that produce machine-readable records. Thus, if one were using a word-processor to prepare input to a computer system, it would be possible to edit the material into absolutely clean copy before input, and to have the actual data entry made automatically.

The problem is that very little provision has been made for this type of conversion. Although word-processors create magnetic records, just as computers do, the codes that they use are different. There is good reason for this, since the processing systems are different. In principle, though, there is no reason why the word-processor's output should not be readily translatable into computer-readable form. Only a few manufacturers of word-processing equipment, however, have produced devices and software for this conversion. Fewer still have considered the possibility of using the word-processor's record to drive a computerized photocomposer.

We believe that more manufacturers and systems designers should turn their attention to this. Development of simple, standardized systems for interfacing word-processors with photocomposition systems would, we believe, greatly enhance the attractiveness of both.

COMPUTERIZED COST-ANALYSIS FOR OPTIMIZING PUBLICATION PRACTICES

A number of computer systems have recently been developed which help the publications manager analyze his costs and predict the cost of printing a particular job. These are certainly useful. More useful still, however, would be a computer modeling system which, for any particular publication, would automatically project and analyze the impact on publishing cost of a number of critical alternatives (page size, type of composition, print size, press run, etc.). The effect of such a system would be to permit publishers to make much more efficient use of their resources. It should be particularly helpful to small and inexperienced publishers.

TYPE STYLES DESIGNED ESPECIALLY FOR PHOTOCOMPOSITION

Computerized photocomposition has had to compete with monotype for acceptance in scientific and scholarly publishing. To compete effectively, manufacturers of photocomposition equipment have tried to develop type styles that would be similar to (ideally indistinguishable from) the most-used styles employed in traditional typesetting.

So far as we know, no attempts have been made to develop new type styles specifically for photocomposers. With the storage capacity, range, and flexibility of "third-generation" (CRT) photocomposers, this possibility should be explored. A CRT-driven photocomposer can, in principle, produce any character, of any design. Moreover, it can automatically modify the character in various ways (by elongating, contracting, slanting, and so forth). With these devices, it should therefore be possible to produce characters, designed according to scientific principles, that would maximize the efficiency and effectiveness of the printed word.

ORGANIZATIONAL MECHANISMS FOR COOPERATIVE PUBLISHING

Scientific publishing is highly fragmented. One of the main ways in which it differs from popular publishing is that it is basically short-run publishing. This afflicts it with diseconomies not present in commercial publishing; these are aggravated by the fragmentation. One way to mitigate the economics of scientific publishing would be to increase the amount of cooperative publishing. Despite many well-intentioned attempts, this has remained largely an elusive goal. The reasons for this are various, but we believe that one of the most important has been the lack of effective organizational mechanisms for joint publishing. Most of the organizations that cut across societal lines have functioned more as forums for discussion of common problems than as frameworks for joint activity.

We believe that it will become increasingly important to have mechanisms for joint activity, and that scientific societies and other publishers will be forced to surmount the social barriers that have inhibited the development of joint publishing. Facility-sharing would be a particularly logical and potentially fruitful area for joint activity. In fact, the application of contemporary high technology to scientific publishing may be possible only through facility-sharing or some other cooperative endeavor, because the equipment and systems are expensive, yet capable of processing such huge volumes of material that no single publisher could keep them fully occupied.

GREATER INTER-SOCIETY COOPERATION IN THE DISSEMINATION OF SEPARATES

Increasingly, distribution of separates is being made to work as an alternative, rather than a supplement, to the scientific journal. The basic reason for this is that the distribution of separates gives the reader much greater selectivity than the conventional journal does. A logical extension of this would be to develop systems whereby readers could readily transcend the boundaries of the societies to which they belong to order separates that interest them. To make this possible, societies would have to develop special, cooperative alerting, ordering, and order-fulfillment mechanisms.

RAPID, INEXPENSIVE TELEFACSIMILE

Telefacsimile transmission of documents, in its present state of development, is a useful means of communication for fairly limited applications. The limitations are partly in the quality of transmission: most facsimile equipment provides only limited resolution, so it cannot be used for fine detail or complicated graphic materials. More than this, though, facsimile's expense has generally limited its use to the transmission of short documents of major importance. The expensiveness of telefacsimile is only partially due to the price of the equipment; the price of all equipment needed for one station ranges from about $1,000 to $4,000. Rather, the problem lies in the speed at which the equipment operates. Telefacsimile uses telephone voice lines to transmit encoded visual information. Depending on the degree of resolution needed for the transmission of a particular document, the time required to process one 8-1/2" x 11" page would range from 2-6 minutes. This is too slow to permit the economical use of telefacsimile for transmitting long documents over long distances, simply because of the cost of the long-distance telephone connections.

What is needed is a high-speed facsimile system, which could process a page in a few seconds, giving reasonable resolution, and using voice-grade telephone lines. Better yet, the system should be self-feeding, so that the operator could place an unassembled document in a hopper, then leave the machine to transmit each page in turn. With such a system, telefacsimile could become practical as a means of disseminating scientific articles on demand.

GUIDELINES ON READABILITY FOR PUBLICATION DESIGN

As we use the term here, "readability" refers to the degree of ease or difficulty with which humans can visually and intellectually process text, as a function of the text's physical characteristics: letter size, shape, color, and design; line length, paper color, leading, etc. The effect of these factors on the speed and ease with which people can read, and on their comprehension and recall of the material that they have read, has been studied for some years. To date, however, the results of this research have been applied only in the field of commercial advertising; their utility for the design of scientific publications has gone almost totally unexplored.

We recommend that the results of research into readability be translated into formulae that could be used by editors and publishers to optimize the designs of their publications. Certainly there is no such thing as a single ideal for readability. It should be possible, though, to develop general guidelines that would relate the various components of readability to each other in a meaningful, helpful way (e.g., preferred type styles and sizes for certain line lengths). As publication design is practiced now, decisions affecting readability are made on the basis of intuition, subjective preference, and past experience. In other words, the making of such decisions is more art than science. What we are suggesting would not eliminate the artistic element, but should provide it with a scientific foundation, resulting in better decisions, made with greater confidence.

IMPROVED SYSTEM FOR MANAGEMENT OF INTEREST PROFILES IN SELECTIVE DISSEMINATION PROGRAMS

Selective Dissemination of Information (SDI) and Selective Dissemination of Documents (SDD) both seem well on the way to establishment as major components in the "system" of formal scientific communication. Their appeal lies in the control that they give to the reader or user over the material which is delivered to him. Although some SDD systems notify the user of every document in the data base, and let him decide which ones he wants, this approach has limited potential. The ideal system would be one which maintained a profile of the user's interests, and automatically delivered to him the citations or documents that matched this profile. Several scientific publishers are now experimenting with or operating selective dissemination programs of this type.

To produce maximum benefit, new, more sophisticated systems must be developed for creating and managing interest profiles. An individual's constellation of interests is neither simple nor static. Some of a scientist's areas of interest are of relatively short duration (perhaps a few years), and are likely to be relevant to a particular research project or area of activity. Others are more fundamental to the person, and may endure throughout a professional career. Most present systems for creating interest profiles do not even attempt to distinguish between these two types of interests. Another limitation of present approaches to interest-profiling derives from the sponsorship of existing SDD programs. Most, if not all, of these are sponsored by particular societies or federations. The profiles they create, therefore, relate only to their own publications. They do not accommodate any interests that extend beyond the purview of the sponsor. The ideal interest profile, on the other hand, would take account of *all* of a reader's interests.

The type of system we envision would necessitate inter-societal cooperation. Each user would have to create and maintain only one interest profile, which would be matched against the publications of all societies that process information that he could use. Admittedly, this ideal is far removed from present reality. We believe, though, that if major societies with cognate interests begin now to work together, this ideal can be rapidly brought much closer.

HOME "INFORMATION CENTER"

Within the last year, several systems have been announced which permit direct access from a person's home to a data base, using a modified television set. Most of these systems use cable transmission, although other types of connections are possible (telephone, regular broadcast, etc.). The user's television receiver is modified by the addition of three devices: one to permit it to receive an extra signal (which is broadcast in the "gaps" between the images in the normal transmission), one to permit the user to select the images he is to receive, and a third to produce a printout of the image that appears on the television screen.

These systems have all been built around transmission of news of some sort: straight news, stock-market reports, racing information, and the like. We suggest that such a system might fruitfully be applied to scientific data bases of various sorts. In such an application, the connection to the data base would probably have to be by telephone line, but this poses no serious technical problem. The virtue of the system would be that it would provide nearly instantaneous access to scientific information, and immediate delivery to the user of the material he wanted.

Sources of Additional Data

For an interesting debate on the merits of such a system, see:

"Arguments for a Moratorium on the Construction of a Community Information Utility," by Lawrence I. Press; *Communications of the ACM*, Vol. 17(2), December 1974.

"ACM Forum: On the CIU," letters from John McCarthy, D. B. Anderson, and Lawrence I. Press; *Communications of the ACM*, Vol. 18(5), May 1975.

Predictions of the technical feasibility of home facsimile units appearing on the market in the near future are given in:

" 'Fax' in the Home: Looking Back and Ahead," by Daniel M. Costigan; *IEEE Spectrum*, September 1974.

INDICATION OF AUTHORS' SUBSEQUENT RESEARCH INTERESTS

According to some studies, more than half of the authors of research articles appearing in scientific journals have, by the time their articles appear in print, completed at least one additional research project. It would be helpful to the reader to know what the author's subsequent research interests have been; this would help the reader to decide whether to contact the author.

An easy way to provide such an indication would be to send the author a form, just before his article was typeset, asking him to briefly indicate the area(s) he had worked in since completion of the work described in his article. This information would be used to prepare a brief note that would be printed at the end of the article, or after the list of references.

STANDARD SIGNS AND SYMBOLS FOR SCIENTIFIC AND TECHNICAL WRITING

When authors of scientific and technical papers fail to use standard signs and symbols, they create problems for the editorial office and the typesetter. We use the word "standard" loosely, since, in many fields, no "official" standards exist; perhaps "conventional" would be a more appropriate term. The American National Standards Institute has drafted standards for signs and symbols for use in the physical sciences and technology.[1]

Authors depart from convention in their use of signs and symbols partly from a need to express new concepts, but partly out of ignorance of signs and symbols already available. Often they create new, idiosyncratic symbols when perfectly satisfactory ones already exist.

With traditional hot-lead methods of typesetting, this behavior was an annoyance, but did not present an insurmountable problem. With the advent of newer, less expensive methods of composition, things have changed. Whereas in monotype composition a new character could always be created, in other systems this is not always so. Third-generation computerized photocomposers can store and produce any character, but all characters must first be digitized. Less sophisticated computerized photocomposition systems are much more limited, and have trouble dealing with exotic characters. Direct-entry photocomposers and strike-on photocomposers are more limited still. Thus, it is more important now than formerly that authors be aware of all "standard" signs and symbols for their disciplines, and use them in preference to developing new ones.

For this to happen, responsible organizations must undertake the task of informing the authors in their fields. The work of the American National Standards Institute is most laudable; major professional societies and journal editors should promote use of the ANSI standards wherever possible, and, where needed, develop compatible ones in their own fields. Journal editors could then require that authors adhere to these standards in preparing papers.

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[1] ANSI Y10.20–1975: Proposed American National Standard–*Mathematical Signs and Symbols for use in Physical Sciences and Technology*

GLOSSARY

Algorithm – A statement of the step-by-step procedure for the solution of a complex problem

Audio Cassette – A small cartridge of magnetic recording tape, with enclosed reels; size has become standardized throughout word-processing industry, enabling interchange between various devices

Batch Processing – A processing approach which accumulates items and processes them at one time, rather than one by one

Blow-Back – Full-size print-on-paper copy of information stored in microform

Character Reader – A device which inputs printed characters directly into a computer by photoelectronically sensing them and converting them into digital, computer-processable codes

CIM (Computer Input Microfilm) – Microfilm used for high-speed input of information into a computer

Citation Indexing – Bibliographic tracing technique which relates papers to one another through the association of their citations and references

COM (Computer Output Microfilm) – Computer-generated microfilm record of information which might normally be output via line-printer or VDT

Computer Graphics – Diagrams, tables, designs, etc., generated by computer and presented as visual displays via VDT, line-printer, COM, or photographic film

Computer Line-Printer – A printing mechanism utilizing characters on continuous belts, called print chains, which are driven by a computer, to output data and textual information

Computer Network – Physically dispersed configuration of data-processing facilities interconnected in such a way as to permit various communication and computational linkages

Computer Printout – Hard-copy output produced by a computer output device

Computer Readout – Soft-copy computer output, displayed on a VDT

Control Terminal – Any remote device used to input commands which control operations in a computer time-sharing system, or any remote device used to acquire computer output.

Controlled Vocabulary – A fixed list of terms used to index materials for storage and retrieval

Conversational Mode – Interactive communication between a computer and a user, in which the computer responds to a user query or command in real time, allowing the user to carry on an extended dialog

CRT (Cathode Ray Tube) – An electronic display device, similar to a television picture tube, used to display information or graphics, usually from a computer

CRT Composition – Phototypesetting in which photo-offset plates are produced by filming computer-composed copy directly from a cathode ray tube at speeds up to thousands of characters per second

Cursor – A controlled light indicator on a CRT screen which shows where an operation is being performed on the screen; a pointer used to designate characters or segments of characters for editing purposes

Data Base – A comprehensive, controlled, structured collection of information – usually refers to a computerized file

Data Element – An explicitly defined unit of information in a computer file

Data Link – The communication apparatus necessary for the transmission of computer-readable information between two or more points

Data Set – 1) A control device which governs the interface between processing and communications devices; 2) the group of data elements which constitute a file in a computer record

Descriptor – A term or group of terms applied to a document to permit its subsequent location and retrieval by the significant aspects of its subject content
SEE ALSO Keyword

Direct Access – The ability to go directly to a desired item in a storage and retrieval system, without having to scan any other portion of the storage file

Facsimile System – A system which electronically scans graphic information, converts it to energy impulses, and remotely transmits these impulses (usually via telephone lines) to a receiver which reconverts the impulses to a print-on-paper reproduction of the original

Field – A portion of an information record designated for the storage of specified information

File – Any organized, structured collection of information

Floppy Disc – Flexible discs used for magnetic storage of computer data, resembling 45 rpm phonograph records and capable of storing up to 60 pages of text per disc

Hard-Copy – 1) Print-on-paper or microform output of information stored in a computer; 2) print-on-paper blow-back of information stored in microform

Input – The operation of entering materials into a computer or other processor; a generic name for the materials entered

Interface – The connecting point or area between two systems; usually refers to the hardware and software necessary for the coupling of two processing components or systems

Keyword – A significant word, usually appearing in the title or text of a document, selected as an indexing term

Laser – Light Amplification by Stimulated Emission of Radiation: a light-energy generation device, used in various microform-production and optical-scanning systems

Light-Pen – Device connected to a CRT which emits a beam of light that, when shone on the screen, can be sensed by the computer that is generating the image on the screen. Usually used to edit or create material on a screen and to enter information into a computer

Microfiche – Type of microform in which the images are captured as frames in a matrix on a flat film plate, usually 4″ x 6″ in size

Microfilm – Type of microform in which the images are captured on a film roll, and packaged in open reel, self-threading cartridge, or cassette

Microform – Film, or opaque card, onto which images have been photographically reduced to a size which necessitates viewing through sophisticated magnification systems

Microprint – Type of microform in which the images are captured in a matrix on opaque (paper) cards of varying sizes

Microform Polarity – Refers to presentation of information in microform. Positive polarity: black characters on white background. Negative polarity: white characters on black background

Microform Reader-Printer – A device with a viewing screen for visual display, combined with a mechanism for producing hard-copy blow-back (print-on-paper), of information stored in microform. Hard-copy blow-back appears in reversed polarity from the microform image

Micropublishing – The initial dissemination of published information in microform

Microrepublishing – The dissemination of previously published information in microform

Mnemonic Code – Any set of letters or symbols whose intelligibility or retention is facilitated by the user's associative memory

Noise – Any stimulus which interrupts or distracts attention from a specific theme; in information storage and retrieval systems, all of those documents returned in a search which do not deal with the sought-for subject

OCR (Optical Character Recognition) – A technology which uses optical scanners to convert printed characters into machine-readable form

On-Line– To be directly connected, via various modes of telecommunication, to a computer; enables real-time interaction with computer

On-Line Editing– The ability to correct and manipulate, from a terminal, information stored in a data base

Optical Scanner – SEE OCR

Peripheral Equipment – Devices connected to, but not part of, a computer (e.g., input/output devices)

Photocomposition – Preparation of copy for offset printing by strictly photographic, rather than mechanical, processes

Phototypesetting – SEE Photocomposition

Random Access – SEE Direct Access

Real Time – In data processing, actions occuring in the present; not subject to lengthy delays (e.g., telephone conversation as opposed to written communication) SEE ALSO Conversational Mode

Remote Batch Processing – Batch processing initiated and/or controlled from a terminal located away from the central computer

Remote Job Entry – Entry of data and/or operating instructions into a computer from a remote terminal

Soft-Copy – Visually displayed information, stored in a computer or in microform

Software – All of the operational/instructional materials used to control computers, photocomposers, or other automated equipment

Storage Device – Any apparatus in which information may be stored for later retrieval

Telecommunications – The electronic, remote transfer of information via wired or wireless signals

Teleconferencing – The connection of remotely located groups of individuals for real-time interaction; usually facilitated by a telephone network, and may include video capabilities

Terminal – An input/output device, usually utilizing a keyboard, used to communicate between two points

Text-Processing System – A computerized system designed to edit and reformat text, and to output that text in a specified medium and format

Thesaurus – A collection of terms, arranged according to a logical schema, with specified interrelationships. Used to index documents and to construct strategies for searching data bases

Throughput – The volume of work processed, usually during a specified time period

Time-Sharing System – A system which enables multiple, simultaneous real time use of a computer, through ultra-high-speed switching of processing time

VDT (Visual Display Terminal) – A CRT used for viewing and editing material stored in a computer, in a magnetic storage device, on paper tape, or in any other storage medium

Videotape – Magnetic recording tape capable of recording the electronic impulses representing a moving image, and immediately reproducing that moving image without wet processing (developing)

Word-Processing Equipment – Typewriter-like equipment capable of capturing (via keystroke), storing on magnetic cards or tape, manipulating, and outputing (in magnetic or paper media) textual material

SUGGESTED SOURCES OF ADDITIONAL INFORMATION AND DATA

The following additional sources are suggested to readers interested in acquiring a broader understanding of innovation in scientific communication, and of some of the basic technologies involved.

References and Handbooks

Pocket Pal–11th edition, 1974. Published by the International Paper Company, 220 East 42nd Street, NY, NY 10017. Price $1.50. An excellent guide for beginners to the processes and terminology of all major graphic arts.

Graphic Arts Encyclopedia–George A. Stevenson, 1968. Published by McGraw-Hill Book Company, NY. An extensive, detailed reference organized alphabetically by terminology. Somewhat dated.

The Printing Industry–Victor Strauss, 1967. Published by the Printing Industries of America, Washington, DC. Somewhat dated, but still an excellent treatment of printing techniques and technologies; probably the most detailed work available in its field.

The Video Handbook–2nd edition, 1974. Published by Media Horizons, Inc., New York, NY. Price $11.25. A comprehensive overview of the equipment, processes, and techniques involved in non-broadcast television.

The Compleat Videocassette User's Guide–1974. Published by Knowledge Industry Publications, Inc., Tiffany Towers, Box 429, White Plains, NY, 10602. Price $29.50. Deals solely with the technology and application of videocassettes.

Guide to Micrographic Equipment–6th edition, 1975, edited by Hubbard W. Ballou, 3 volumes. Published by the National Micrographics Association, 8728 Colesville Road, Silver Spring, MD 20910. Price $22.00 An extensive, up-to-date reference to micrographic equipment, with volumes on production equipment, readers/printers, and COM recorders.

Special Topical Publications

A Workbook for Journal Editors–1970. Published by the Association of Academies of Science, 445 King Street, Columbus, OH 43201. Proceedings of a conference, held in 1969, convened exclusively for editors of journals published by various academies of science.

Scholarly Reprint Publishing in the United States–Carol A. Nemeyer, 1972. Published by R. R. Bowker Company, NY. Presents a broad overview of the reprint industry in the U.S., both in historical perspective and in terms of present practice. Good for orientation.

Strategies for Change in Information Programs—William E. Hug, Editor, 1974. Published by R. R. Bowker Company, NY. A collection of 24 readings organized around two basic themes: "The Subtle and Ubiquitous Nature of Change," and "Alternative Strategies, or Ways to Aim at A Moving Target." A variety of viewpoints are included, but most are oriented toward educational uses of information.

Photocomposition Today—Published by Maclean-Hunter Publishing Corp., 300 West Adams Street, Chicago, IL 60606. A collection of articles by Frank Romano which previously appeared in *Inland Printer/American Lithographer* magazine.

Technological Change in Printing and Publishing—Lowell H. Hattery and George P. Bush, Editors, 1973. Published by Hayden Book Company, Rochelle Park, NJ. A good introduction to the topic.

IEEE Transactions on Professional Communication—Volume PC-16, No. 3, September 1973. A special issue devoted to the proceedings of a Conference on the Future of Scientific and Technical Journals held in May, 1973. Many useful and provocative papers.

Economics of Scientific Publication—1973. Published by the Council of Biology Editors, Washington, DC. Proceedings of a workshop sponsored by the Council in May, 1973. Covers a broad spectrum of topics and views, ranging from basic policy through mechanics of production.

Cameraready—Kenneth Caird, 1973. Published by the Cameraready Corp., Box 5812, Pasadena, CA 91107. Price $30.00. A looseleaf manual covering all aspects of the preparation of copy for printing, reproduction, binding, packaging, and distribution. Reviewed in:

> *IEEE Transactions on Professional Communication*, Vol. PC-16(3), September 1973, p. 182.
> *Technical Communication*, Fourth Quarter 1973, p. 23.

The works of Edwin R. Lannon, and the Federal Electronic Printing Committee, under the chairmanship of John F. Haley, offer an extensive, if slightly dated, review of photocomposition technology.

> *A Review of the Costs of Electronic Composition* and *A Bibliography of Electronic Composition*. Joint Committee on Printing, Federal Electronic Printing Committee, Washingon, DC, 1970. Available through the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.
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> *The Costs of Electronic Composition Revisited*, by Edwin R. Lannon, Deputy Director, Bureau of District Office Operations, Social Security Administration, U.S. HEW. A paper presented to the Graphic Communication Computer Association of Printing Industries of America, at Chicago, IL, May 16, 1974.
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> *The Costs of Electronic Composition in 1974: A Study of Comparative Costs*, by Edward R. Lannon, Deputy Director, Bureau of District Office Operations, Social Security Administration, U.S. HEW. A paper presented to the Conference on "The Computer in Printing and Publishing—Experiences and Prospects," Cafe Royal, Regent Street, London, England, September 11, 1974.

Professional Journals

Journal of Micrographics—Published bi-monthly by the National Microfilm Association, Silver Spring, MD. Price $25.00 per year. The basic technical journal concerned with micrographics.

Scholarly Publishing--Published quarterly by the University of Toronto Press. Price $10.00 per year. A journal devoted to improving the publishing of academic and scientific materials. Attractive, informative, and enjoyable.

IEEE Transactions on Professional Communication—Published quarterly by the Institute of Electrical and Electronics Engineers, Inc., NY. Subscription rate to non-members available on request. Deals with technical writing and editing, publications management, and scientific and technical publishing in general. Focus is *not* limited to engineering communication.

Technical Communication—Published quarterly by the Society for Technical Communication, Washington, DC. Price $15.00 per year. Deals primarily with topics of interest to the technical writer or editor in an industrial or commercial setting.

Science—Published weekly by the American Association for the Advancement of Science, Washington, DC. Price $50.00 per year. Occasionally carries editorials and articles concerning the dissemination of scientific and technical information.

Journal of Chemical Information and Computer Sciences—Formerly the *Journal of Chemical Documentation*, published quarterly by the American Chemical Society, Washington, DC. Price $28.00 per year. Frequently carries editorials and articles concerning scientific communication.

Visible Language—Formerly the *Journal of Typographic Research*, published by the MIT Press, Cambridge, MA. Price $14.50 per year. Subtitled "The Journal for Research on the Visual Media of Language Expression," this provides very broad coverage of typography, graphic design, the origin and evolution of letterforms, and related topics from an interdisciplinary viewpoint—spanning the visual arts, the humanities, and several fields of science.

Special Information Services and Newsletters

Knowledge Industry Report—Published semi-monthly by Knowledge Industry Publications, Inc., White Plains, NY. Price $75.00 per year. Covers a wide range of information and communication topics, including new trends and prospects.

Graphic Communications Weekly—Published weekly by Technical Information, Inc., Los Angeles, CA. Price $95.00 per year. News and technological developments in printing, publishing, and micrographics. Good for current awareness.

The Seybold Report—Published semi-monthly by Seybold Publications, Inc., Haddonfield, NJ. Widely regarded as the most authoritative publication devoted to composition technology.

Information—Published ten times per year by Science Associates International, Inc., NY. Price $25.00 per year. News on developments, meetings, grants and contracts, and publications in the information sciences.

Word Processing Report—Published semi-monthly by Geyer-McAllister Publications, Inc., NY. Price $63.00 per year. Current, detailed information on word-processing equipment.

The Association for Scientific Journals Newsletter—Irregular. Available at no cost. Published by ASJ, Editor: Jim Lufkin, G2118, Honeywell Plaza, Minneapolis, MN, 55408.

Intercom—Published bi-monthly by the Society for Technical Communication, Washington, DC. Free to members. Newsletter of the STC.

The Bulletin of the American Society for Information Science—Published ten times per year by ASIS. Free to members; $27.50 per year for non-members.

Datapro Information Services—Published by Datapro Research Corp., Delran, NJ. Presents several loose-leaf information services on an annual subscription basis—most pertinent are: *Datapro Reports on Office Systems* ($350.00), and *Datapro 70* ($460.00). The former examines the current spectrum of office products, systems, techniques, and companies for office management, while the latter reviews EDP hardware, software, services, and suppliers.

Trade Publications

Datamation—Published monthly by Technical Publishing Co., Barrington, IL. Devoted to computer technology and applications; occasionally has useful articles on peripheral equipment and processing technologies used in text-processing.

Administrative Management—Published monthly by Geyer-McAllister Publications, Inc., NY. Price $8.00 per year. Features comparative reviews of word-processing and other office equipment.

Folio—The Magazine for Magazine Management—Published bi-monthly by Market Publications, Inc., New Canaan, CT. Price $15.00 per year. Oriented primarily toward commercial magazine publishing, but occasional articles are useful for scholarly publishers.

Word Processing World—Published bi-monthly by Geyer-McAllister Publications, Inc., NY. Price $4.00 per year. Devoted entirely to word-processing equipment, applica- p-tions, and systems; good coverage of innovative developments.

Book Production Industry—Published bi-monthly by Market Publications, Inc., New Canaan, CT. Free to qualified readers; $10.00 per year for others. Useful primarily for information concerning printing technology.

Information and Records Management—Published monthly by Information and Records Management, Inc., Hempstead, NY. Available free to qualified readers; $7.50 per year for others. Good coverage of micrographic technology.

Infosystems Magazine—Published monthly by Hitchcock Publishing Co., Wheaton, IL. Available free to qualified readers; $20.00 per year for others. Primarily treats management of in-house data-processing systems.

Modern Data—Published monthly by Modern Data Services, Inc., Hudson, MA. Available free to qualified readers; $18.00 per year for others. Oriented to computer and telecommunications technology.

Publishers Weekly—Published weekly by R. R. Bowker Co., NY. Price $25.00 per year. Basic source of publishing news.

Printing Management with Printing Magazine—Published monthly by Inter/Com, Inc., Berea, OH. Available free to qualified readers; $12.00 per year for others. Good coverage of printing technology, developments in printing, production management.

Inland Printer/American Lithographer—Published monthly by Maclean-Hunter Publishing Corp., Chicago, IL. Price $12.00 per year. Good printing-oriented journal.

Bibliographic and Review Publications

Information Science Abstracts—Published quarterly by Documentation Abstracts, Inc., Philadelphia, PA. Price $60.00 per year.

Graphic Arts Literature Abstracts—Published monthly by the Graphic Arts Research Center, Rochester, NY. Price $28.00 per year, including annual index.

Bibliography of Micrographics, RR2-1974—Published by the National Microfilm Association, Silver Spring, MD. Price $1.50.

Annual Reviews of Information Science and Technology—Published annually by the American Society for Information Science, Washington, DC. Price varies.

A Review of the Literature on Primary Communications in Science and Technology, Jacqueline Hills, 1972—Published by ASLIB, London.

The Invisible Medium: The State-of-the Art of Microform and a Guide to the Literature, Frances G. Spigai, 1973—Issued by the ERIC Clearinghouse, Stanford, CA.